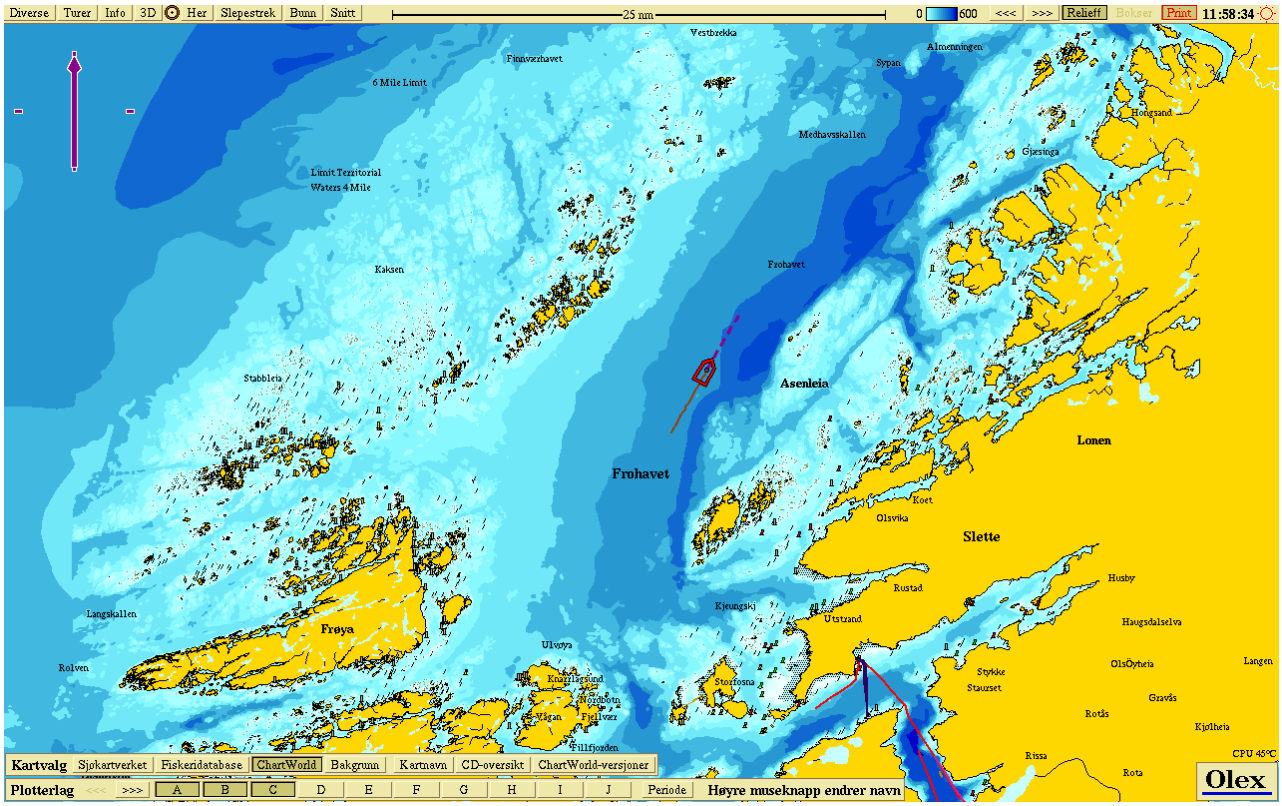
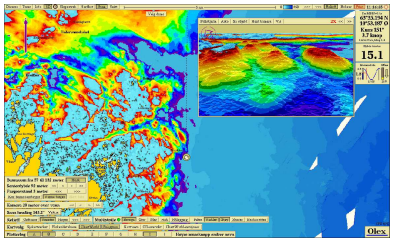
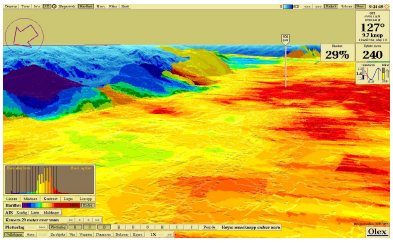
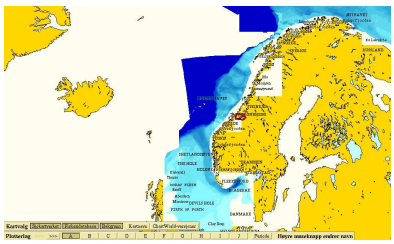
Olex

User manual
version 7.31









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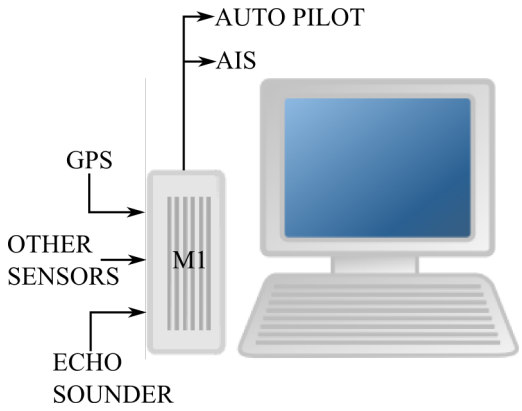
Basic operation

Olex is a complete system for seabed mapping, plotting and navigation. By using GPS and echo sounder, position- and depth data are measured and saved to the system. These data are continuously recalculated and added to previous measurements. The result is visualized as a realistic 3-D image of the seabed.

The system has advanced features for navigation, with the possibility of software extensions for Sonar, ARPA, ITI, AIS, wind - and oceanic currents measurements.



The most widely used installation is on the M1- machine, but Olex can also be installed on a laptop or a desktop PC.

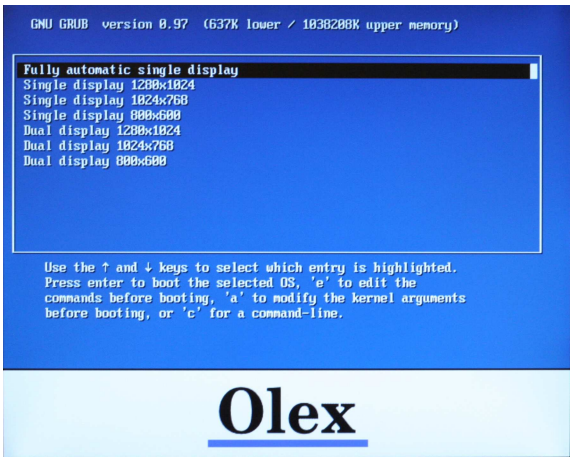
The machine can be operated both with a mouse and keyboard. The keyboard is used for entering names and comments, and also for using hot keys. The mouse is used for zooming in and out, grab objects and select options in the menus.

Starting the system

Start the computer by pressing the "**Power-button**". Before the system is ready, it will go through a start-up sequence, where different screens are displayed as the sequence is completed.

Do not turn off the machine during startup, as this may damage the Olex installation!

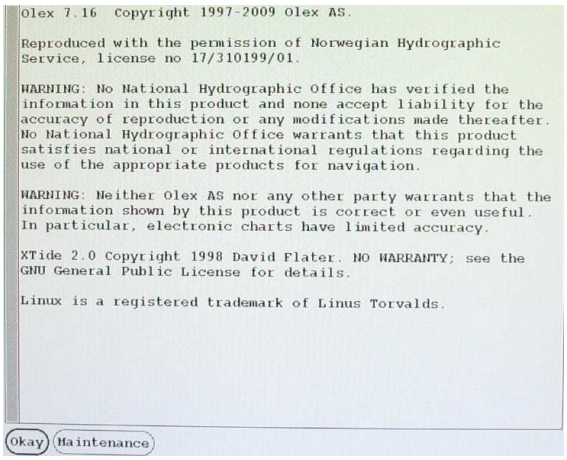
After a few seconds the machine will halt, and a blue screen with an overview of available screen configurations is displayed.



On initial startup or when changing monitor, select screen configuration by using the arrow keys to move the marker up or down. The recent screen settings will be suggested next time the system is started.
For most systems it is recommended to select "*Fully automatic single display* ". Olex will even find the best screen configuration automatically. If the machine has 2 monitors connected, select one of the "*Dual Display*" resolutions to get a split screen.

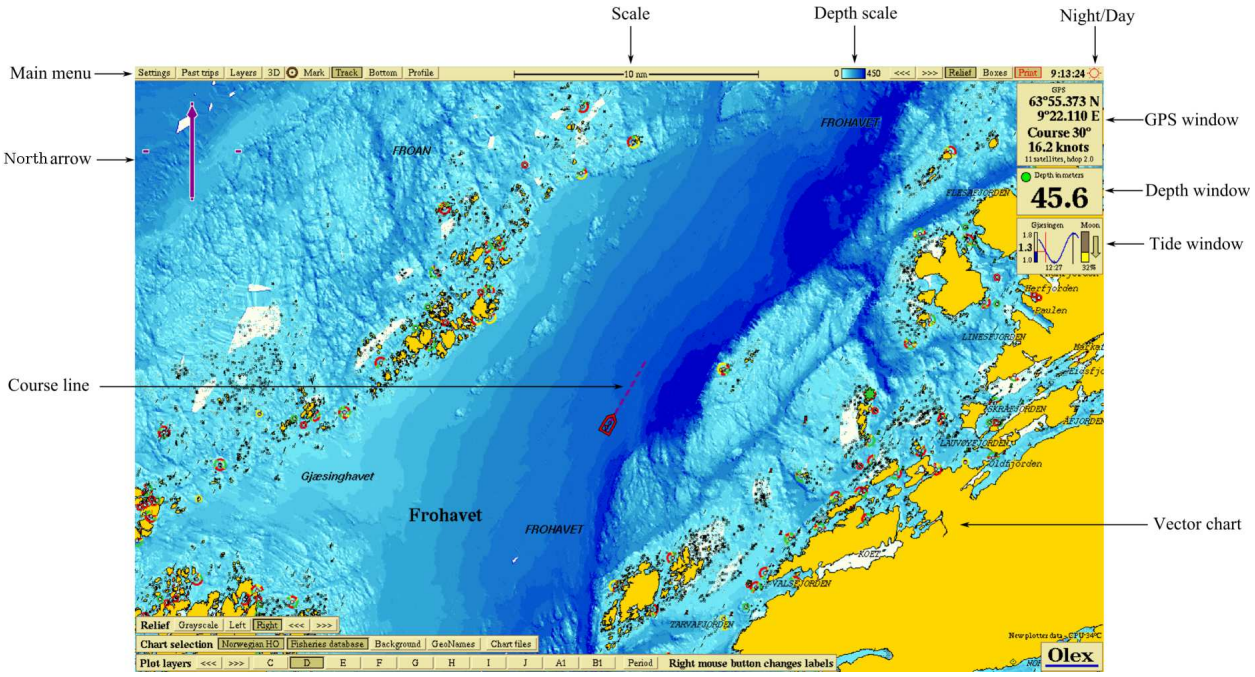
- The main screen on the left monitor. And a copy of the main screen, but without the menu buttons, on the right monitor.
- The main screen on the left monitor, and a 3D view on the right monitor.

Press **Enter** to proceed or wait until the machine boots automatically. The machine halts again when the window displaying the software rights opens.



Click Okay to confirm, or wait until the start-up procedure resumes automatically. Click Maintenance to open "*Maintenance mode*", see "Maintenance Mode" on page 88.

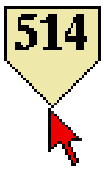
The main screen



Typical view with the ship sailing towards northeast in the middle of the screen. The dashed course line displays the heading at the moment.

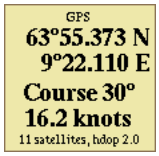
Some objects will change color or appearance when the mousecursor is moved around and touches them.

The map is zoomed in by clicking the right mouse button, left mouse button zooms out.There are also other ways to zoom in and out.
When the map is zoomed in to a certain scale (100 metres), a marker showing the depth value in that point is opened, if measured depth values excists in that point.

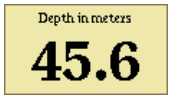


The main menu at the top of the screen has several drop-down menus, and buttons that provide access to various functions. Like changing the chart scale, adjusting colors and night dimming.

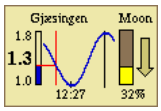
The GPS window is located in the upper right corner, and provides information about the position, course and speed.



The depth window displays the depth value of the last sounding. By clicking inside the panel, a more detailed view is opened.

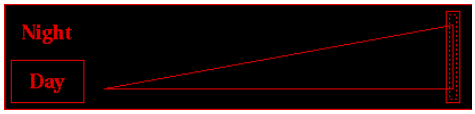


The tide window displays the nearest station for tidal measurements, the present water level, and the time for the next high and low tide.



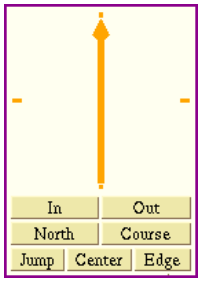
The brightness can be adjusted by using the dimmer function. **The dimmer panel** appears when the mouse pointer touches the sun icon in the upper right corner.

The brightness can be adjusted by moving the slider along the scale. Switch between day- and night colours by clicking Day or Night.



North-arrow

Touch the arrow in the upper right corner. A panel ,where to change the ship's location on the screen and orientation of the map, opens.



Grab the **north-arrow** to rotate the map in any direction, the arrow always always points towards north.

- In - zooms in.
- Out - zooms out.
- North and Course - changes the map's orientation.
- Jump - the ship moves across the screen, while the map is stationary.
- Center - The ship is always located in the center of the screen. If the chart is moved when Center is activated, by using the arrow keys or the mouse, the text below the arrow will change to "New Center".
- Edge - The ship is always located near the edge of the screen, with most of the chart area in front of the bow.

Zooming and rotation leads to a temporary change of view, and the buttons Keep this and Go back opens in the upper part of the screen.

By clicking Keep this, the new setting will be retained. Go back resets the screen immediately. After a period of inactivity, the screen settings will automatically be reset.

Zooming

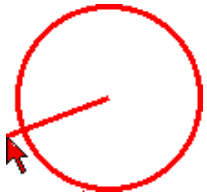
The map can be zoomed in and out in different ways to see details.

- Use the left mouse button to zoom in, and the right mouse button to zoom out.
- Use the buttons In or Out beneath the **north-arrow**.
- Move the mouse scrollwheel forwards to zoom out, or backwards to zoom in.
- Click on the chart scale in the **main menu**, left-click zooms in, right-click zooms out.
- The Page Up and Page Down keys zoom in and out respectively.

Moving the map

The map can be moved in any direction:

- Press the scrollwheel or the middle button on a 3-button mouse. Move the mouse while the button is pressed.
- On a 2-button mouse, hold down both buttons simultaneously.
- Use the arrow keys on the keyboard to move the map.
- Press and hold the middle mouse button or the scrollwheel. Then press and hold one of the other buttons as well.
  A red circle appears. Move the mouse away from the circle and the map will continuously move in the opposite direction. By moving the mouse pointer, the



  map will move in steps in the opposite direction, proportional to the lenght of the red line. When the line is short map will move slowly, and when the line is long the map will move faster.

Buttons and menus

Some buttons opens new menus, and others activates functions.

The button is not activated

When the button is touched, both the text and the frame will turn red.

The button is activated.

If the function is unavailable, the text is light gray, and it is not possible to click on it.

Some buttons have a little gray check box to the left of the text. The function is activated by clicking somewhere inside the red frame.

Power off

Turn off the computer by clicking Settings → Power off, and answer Yes to the question "Do you really want to power off?".

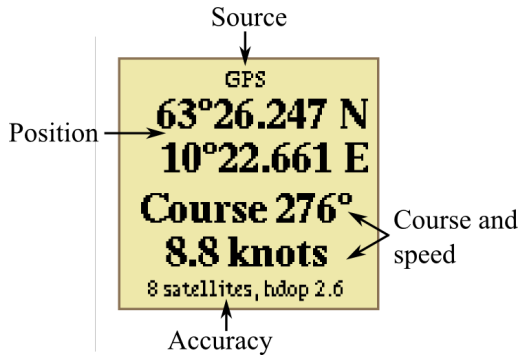
Do not turn off the computer in any other way, chart files or other data may be damaged or lost!

General Navigation

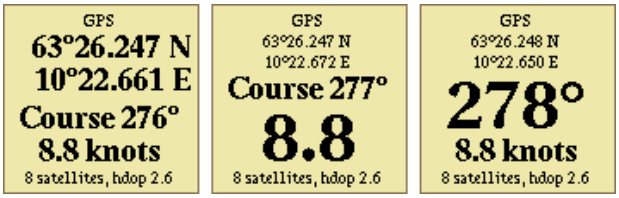
Position from GPS receiver

SOFTWARE: Olex normal installation
HARDWARE: GPS receiver
INTERFACE: serial port/USB

Position, course and speed is displayed in the **GPS panel**. These data are usually provided by the GPS receiver, but can also come from other sources such as AIS, radar or a multi-beam echo sounder. If multiple sources are available, signals from the GPS receiver are given priority. If positioning messages from the GPS is not available, the system uses messages in order of priority from the AIS, multi-beam echo sounder or radar.



The view can be changed by clicking repeatedly inside the window.



The bottom line shows the number of satellites and quality of the position. Low HDOP - *horizontal dilution of precision*, means good position accuracy. Numbers below 4 is considered as good positioning accuracy. If the quality of the GSP signal is poor, the numbers will turn red and the seabed calcultion will stop.

Depths from echo sounder

SOFTWARE: Olex normal installasjon
HARDWARE: Echo sounder
INTERFACE: Serial port or ethernet (ES60)

The depth panel displays the depth of the last sounding. The depth values may be provided by a single beam echo sounder, or a multibeam echo sounder. If there are more then 30 seconds from the last received depth message, the numbers will turn gray. This time may vary, depending on the type of echo sounder.

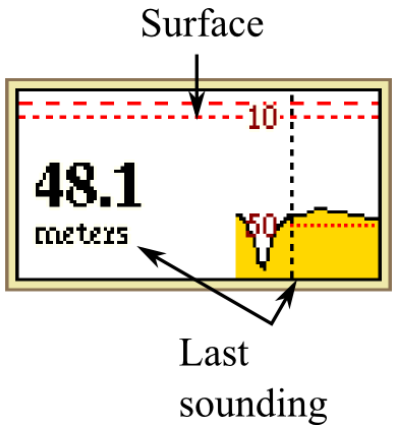
If Settings → Show calculation progress is turned on, a green dot flashes in the panel for each registered depth echo. If the echo sounder detects hardness, this dot may appear in different colours.

-both depth and hardness are registrated.

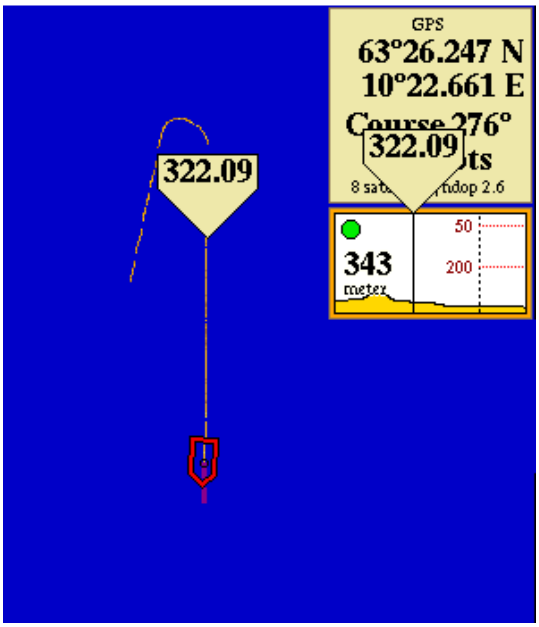
- depth values are registrated, no hardness.

- no depts nor hardness values are registrated.

By clicking inside the depth panel, an echogram displaying the last measured depths, opens.



When the cursor is moved inside the echogram window, a flag displaying the depth value is opened. The depth value is also shown at the corresponding location on the map.



Heading

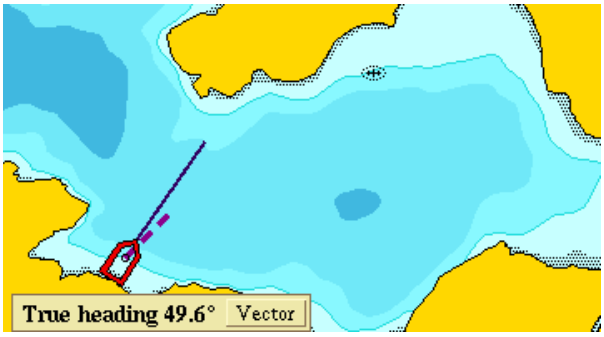
SOFTWARE: Olex normal installasjon
HARDWARE: heading source
INTERFACE: serial port

The heading shows the ship's orientation - the direction the bow is pointing towards. The heading data may be provided by a GPS compass, magnetic compass, radar or an other heading source. If several heading sources are avilable, true heading from GPS is given priority.

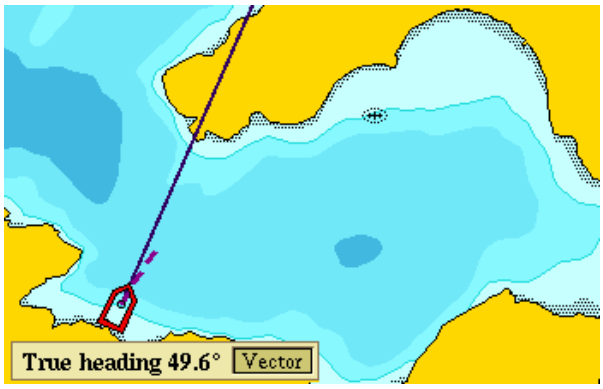
True heading - orientation relative to geographic north.

Magnetic heading - rientation relative to the magnetic north pole.

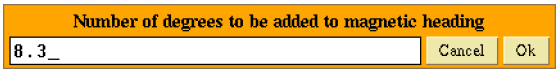
The heading is specified in degrees, and appears as a solid line along the ship's center line.



By clicking on Vector the heading line is extended.



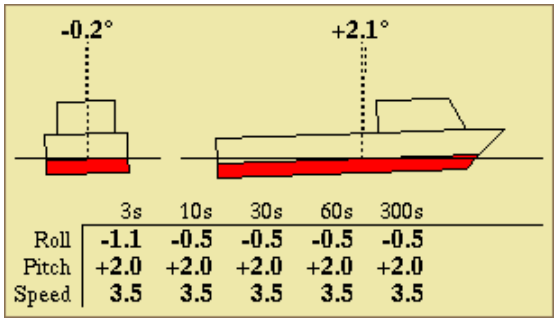
If the heading signal comes from a magnetic compass, "Magnetic heading" will appear , in stead of "True heading" in the panel in the bottom left corner.
By clicking Adjust a new window opens in which it is possible to write corrections for the deviation between true heading and magnetic heading.



Roll and pitch

SOFTWARE: Olex normal installsjon
HARDWARE: roll and pitch sensor
INTERFACE: serial port

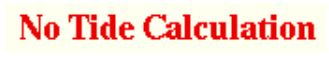
When the machine receives data about the ship's roll and pitch, these data can be displayed by clicking Settings → View roll and pitch.



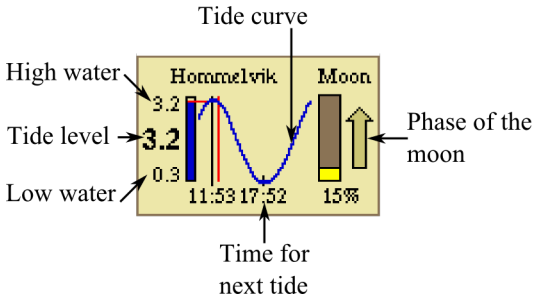
The numbers by the boat symbol displays the current values, while the table displays average values over some time.

Tides

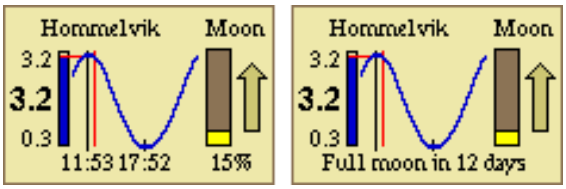
Depth values from the echo sounder are corrected for the tide level. This function is turned on or off by clicking Settings → Adjust bottom calculation for tide level.
This function should always be turned on, except while doing surveys in lakes and rivers. When the function is turned off, the warning "*No tide calculation*" is displayed.



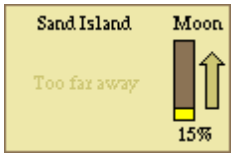
The tidal window displays the name of the tidal station, moon phase and time for the next high or low wather.



The column to the left displays the tidal level, the red cursor displays the current water level and time in the tidal cycle. The time beneath the curve indicates the time for the next high or low tide. The arrow to the right displays the moon phase. When the tide panel is touched withe the cursor, the time until the next full moon is displayed.



Tidal corrections are based on measurements from the Norwegian Mapping Authority over the past 30 years. Olex chooses the nearest tide station atomatically. If the distance to the nearest tide station is more than 100 nm, the tidal calculation will stop and the panel disappears from the screen.

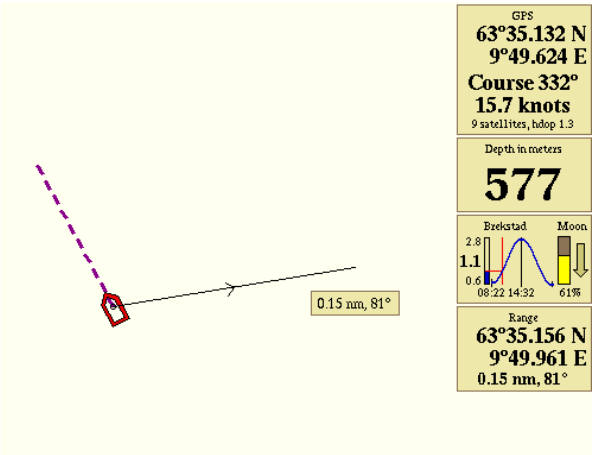


Continously updated ship position

The ship symbol usually moves across the screen in steps, based on the frequence of when the GPS receives positioning signals.
For high-speed vessels, the function Settings → Continously updated ship position should be enabled.The ship symbol's location will be updated continuously based on the current speed and course.

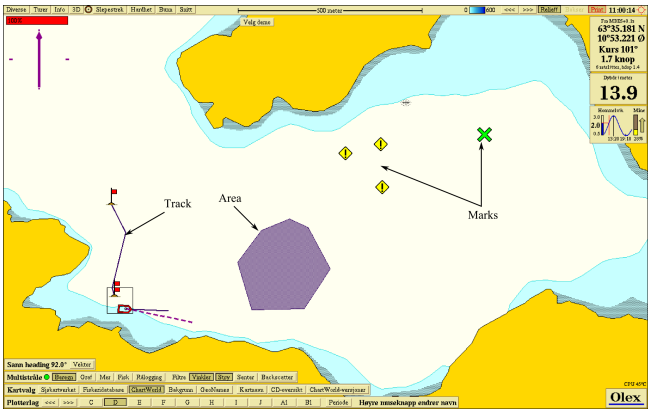
Continuous ranging arrow

To find the distance and heading between the ship and a given point / object, the function Continuous ranging arrow can be used. Click Settings → Continuous ranging arrow.
A line with starting point at the ship, and end point in the cursor will appear on the screen.
The corresponding information panel with positioning information, length and direction will open on the right side beneath the **Tidal Panel**.



Plotter data

Plotter data, or *plotterobjects* are marks, line objects and areas.



This data are organized in plot layers, and saved to the computers harddrive. There are no limits to the amount of data that can be stored.

Mark

A mark can be one single object, or several marks can be connected to form lineobjects. Marks can be displayed with different symbols, a name and text comments.
Choose a mark by clicking it once. A mark can be edited by doubleclicking it, or by first choosing the mark and then click Edit.

- not chosen

- chosen mark

- the mark is chosen and editable

Chosen-mark-panel

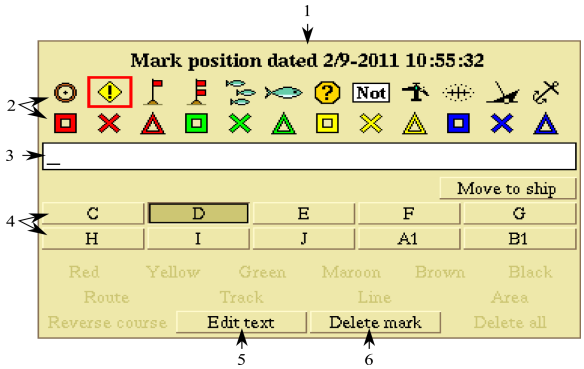
When a new mark is placed, or an existing mark is chosen, the **Chosen-mark-panel** opens.

This panel displays the position, and also have 4 buttons. Autonav, Center, Edit and Finish.

- Autonav - is used for navigation towards the mark.
- Center - clicking this button centers the mark on the screen.
- Edit - opens the **Edit-panel.**
- Finish - closes the panel, and saves the settings.

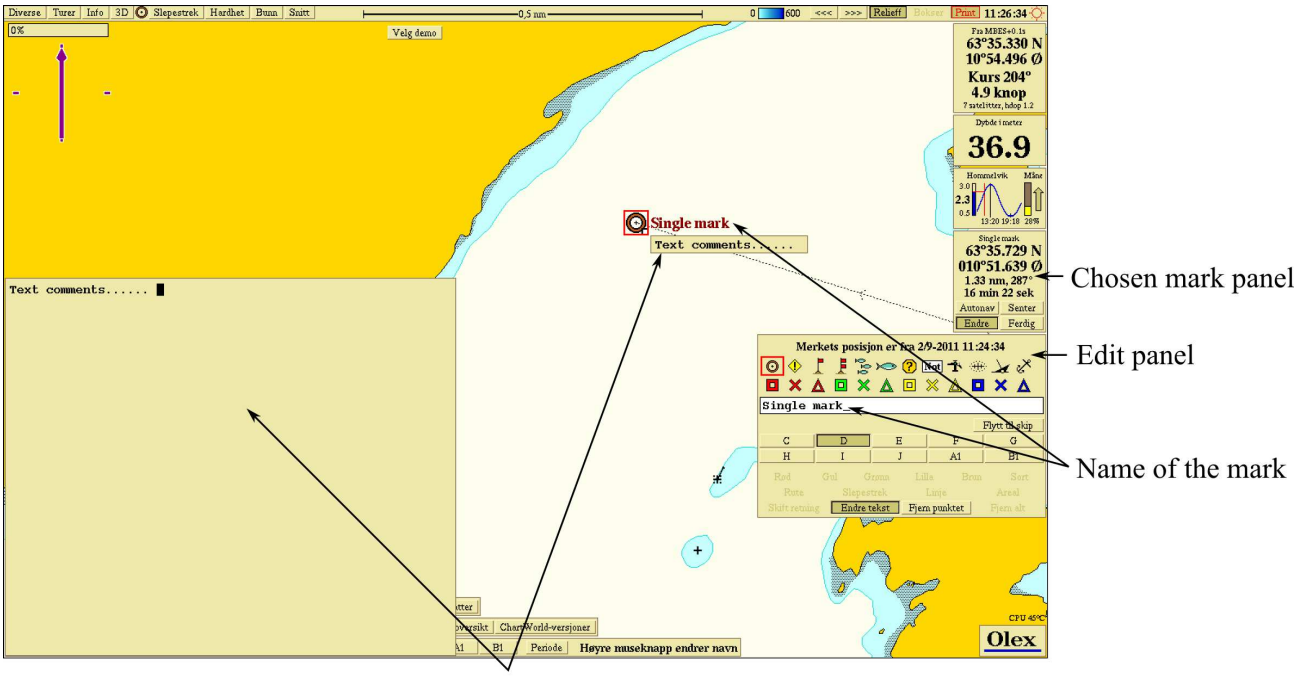
Edit-panel

This panel opens when a plotter object is created or edited.



1. displays the timestamp when the mark is created or changed.
2. displays the symbols to choose between.
3. the mark can be named by writing in this text box.
4. Plot layer assignment can be set by selecting one or more of the plotlayers.
5. Edit text makes it possible to add a text comment.
6. Delete mark removes the mark.

Create a new mark



1. Zoom in until the appropriate screen section is displayed. Grab the mark symbol in the main menu, and drag and drop the mark on the selected location.

   Or hold the “Alt-button” and left-click to place a mark. Once the mark is placed, both the **Chosen-mark-panel** and the **Edit-panel** opens.

2. Choose a symbol in the **Edit-panel**, otherwise the standard symbol will be used.

3. Name the mark, by entering text in the text-field.

4. Determine the plot layer assignment. If not, the predefined plot layer assignment is used.

5. By clicking the Edit text button, a large text area opens. Additional text comments can be entered here. Click Edit text once more to close the text editor. Click on the square on the line object to open and close the text comment.

6. Click Finish to save the changes.

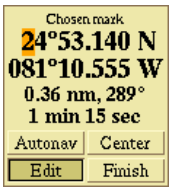
Edit a mark

To edit an existing mark, first open the mark for editing and make the changes. Click Finish to close and save the mark.

Placing a mark on a given position

1. Place a mark at any position.

2. Place the mouse cursor over the first number in the **Chosen-mark-panel**. Enter a value, or click with the right or left mouse button to change the value.



Delete a mark

First open the mark for editing, and then click Delete mark. The mark with name and any text comments will be deleted.

Event mark

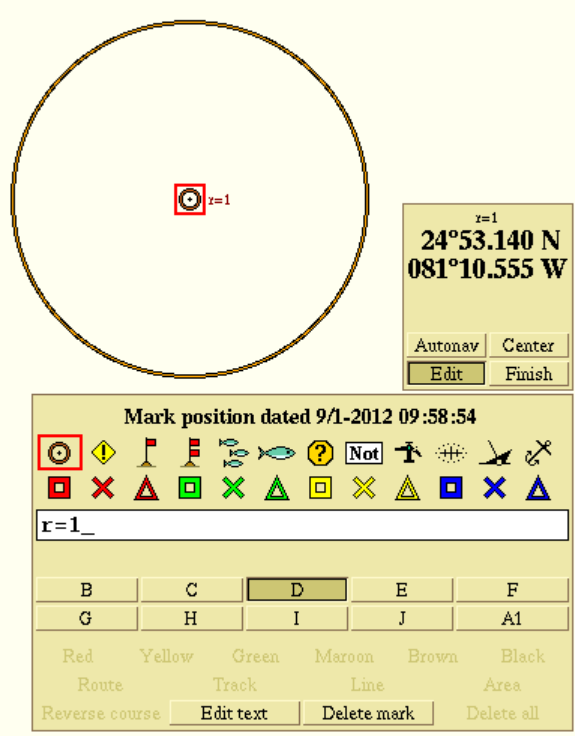
An event mark is placed on the ships position ‘right now’, and can be created by pressing any key on the keybord. The symbol can be changed by clicking Layers → Default settings for new data.

This mark kan be edited and changed in the same way as any other marks.

Circle with a given radius

1. Place a mark at a selected position.
   Enter **r = the value in nm** in the textarea in the **Edit-panel**.

2. A circle with the entered radius is drawn around the mark.



Line objects

Line objects are lines, tracks, routes and areas. There are only minor differences between this objects, and they are generally handled he same way. A line object consists of 2 or more marks connected with straight lines.

Chosen line-panel

When a line object is placed, the **Chosen-line-panel** opens.The text “Chosen line”, “Chosen track” or “Chosen route” appears in the upper part of the panel depending of type of line object. In addition, there will be the length of the lineobject, date and name of start- and stop mark.

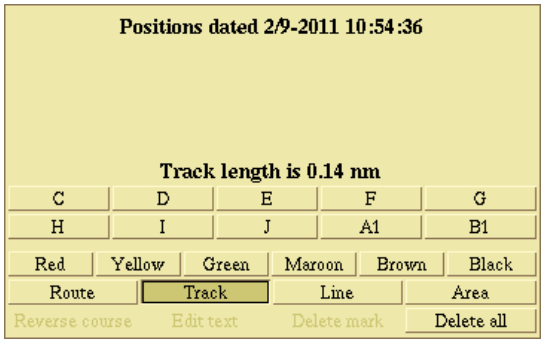
If the line object is an area, the length will be the length of the line delimiting the area.

The panel have 4 buttons, Autonav, Center, Edit and Finish.

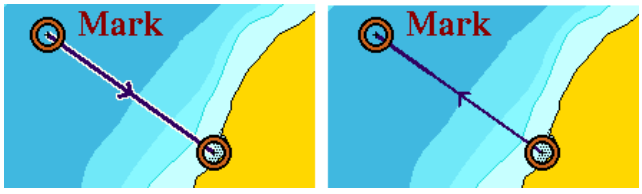
- Autonav - starts navigation towards a selected mark on the line object.
- Center - centers the line object on the screen.
- Edit - opens the **Edit-panel** for editing settings.
- Finish - closes the panel, and saves the settings.

Edit-panel for line objects

This panel opens when a line object is created or chosen. In top of the panel the timestamp, when the line object is created or changed, is displayed.

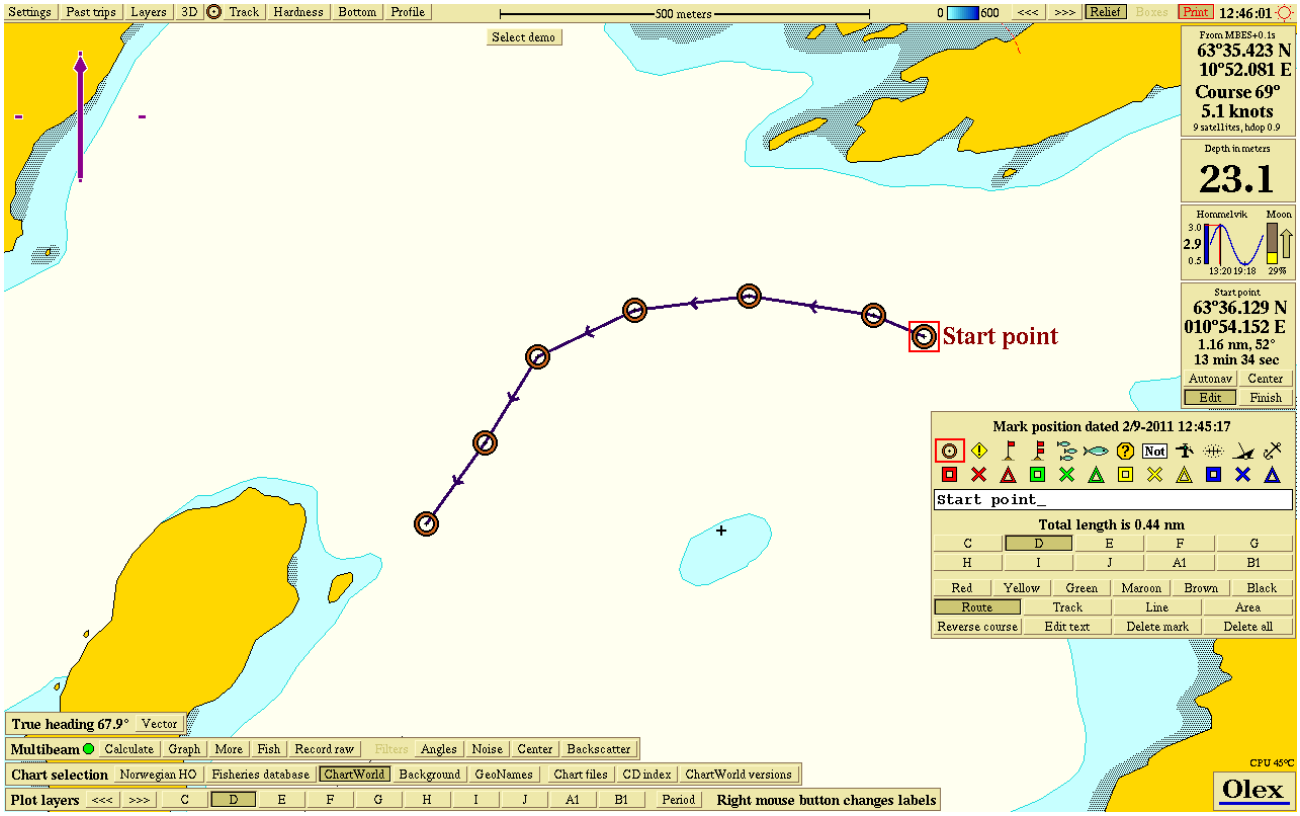


The panel has buttons for layer assignment, choice of color and for chosing the type of line object.
In the lower left corner there is a button named Reverse course, this changes the direction of the line object.



By clicking Delete all, the line object with all marks will be deleted.

Create a new line object



1. Place a mark somwhere on the map. The **Chosen-mark-panel** and the **Edit-panel** will open.
2. While the mark is editable, place a new mark. The marks will be connected with a straight line, and an arrow shows the direction of the line.
3. Add more marks at the end of the line, or create new marks by clicking somewhere on the line between the marks.
4. Choose the type of line object by clicking one of the buttons Route, Track, Line or Area.
5. Choose the color by clicking on of the colors.
6. Choose plot layer assignment by clicking on one of the plot layer buttons.
7. The line can be given a name by entering text in the text field.
8. Save the line object by clicking Finish.

Modify an existing line object

1. Choose the line by clicking on it, the line will start flashing and the Chosen-line-panel will open.
2. Click Edit, and the line object can now be edited.
3. When finsihed editingm click Finish to close the panel and save the changes.

Placing a line object on a given position

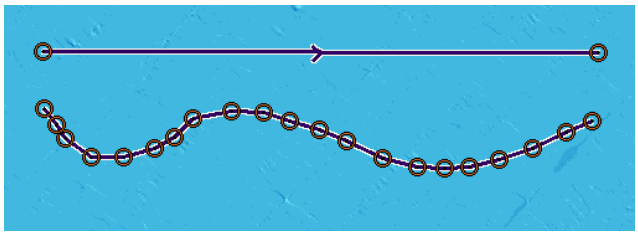
1. Place a mark, and enter the position.
2. Enter a comma (,), and type the position of the next turning point. Continue until the line object is completed, and click Finish in the **Chosen-line-panel** to save and exit.

Delete a line object

1. Chose the line object by clicking it, and choose Edit from the Chosen-line-panel.
2. Click Delete all in the Edit-panel. The line and all marks, names and text comments will be deleted.

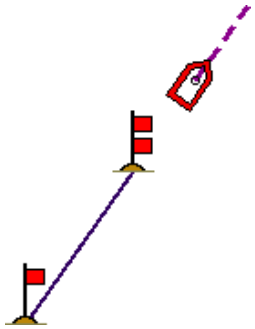
Line

A line is the simplest of the line objects. A single line object consistes of two marks connected with a straight line. A line can be very complex, consisting of several hundreds of marks.



Track

A track is a line object that is recorded in the wessels wake. Click Track to start recording. A start flag is placed in the start of the track, and a solid line is recorded along the course. Click Track once more to stop recording the track line. A double flag is placed on the end mark.



Click Layers → Default settings for new data to change the color.

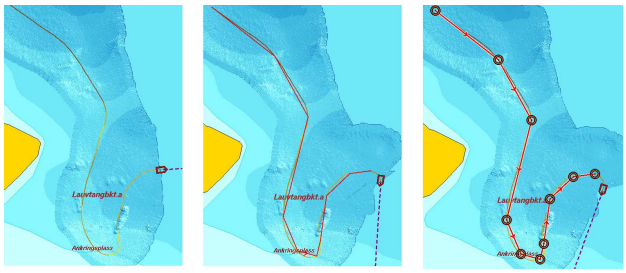
Own track start- and stop flags, lock own tracks against changes and automatic storing of radar tracks can be changed here by clicking Yes or No on the corresponding choice.
Click Ok to save the changes and close the panel.

Route

A route is a track with direction towards a spesific point.

Create a route from trip

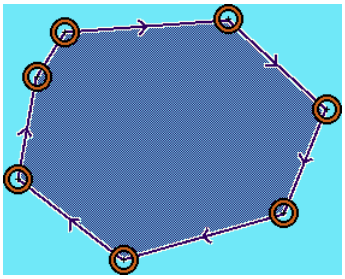
A trip kan be converted to a route. Find the trip, and click Rescale according to this trip in the Past trips menu. Then click Make route from trip.



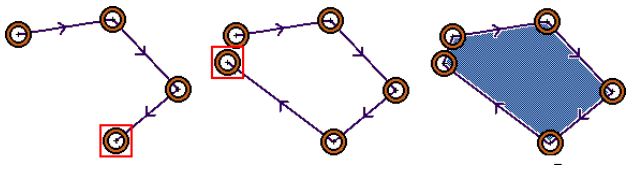
A new line object is drawn along the trip. Choose the route by clicking it, the marks will be visible and the **Chosen-route-panel** opens.
Click Edit, and than click Unlock in the **Edit-panel**.
Confirm when asked “Do you really want to turn off the protection?” Click Finish to save and close the panel.

Area

An area is a line object where the first and last mark are connected.



Create a new area



1. Start by creating a new line object as described in earlier.

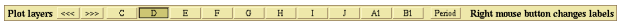
2. When all the marks are placed, click Area in the **Edit-panel**. The first and the last mark will now be connected, and the area delimited by the lines will be filled with a color. The pattern color can be changed by clicking on one of the color options in the panel.

3. Click Finish, and the area is created.

Select the area by clicking on the line object. When the area is chosen and editible, it is possible to move the line segments, add or remove marks, change color and so on.See also“Area and volume calculations” on page 50.

Plot layers

Olex has 60 plot layers named from A to J5. Single plot layers can be turned on or off, by clicking on the buttons in the bottom row of the screen. A plotter object is visible when it's corresponding layer is turned on.



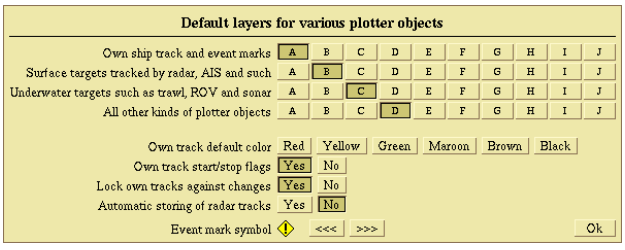
Click Layers → Visible plot layers to turn the row of buttons on or off.

Left <<< and right >>> arrows are used to scroll back and forth through the plot layers.
Period displays the plotterdata sorted chronologically. Click on the arrows to the right to select the timespan. Plotter data stored during this period will be displayed on the screen.
When a plotter object is created, the plot layers assignment can be set manually. Otherwise the object will be automatically assigned to a preset layer.

The objects are preassigned to different plotlayers.

Layer	Type of object
A	Own ship track and event marks
B	Surface targets tracked by radar, AIS and such
C	Underwater targets such as trawl, ROV and sonar
D	All other types of plotter objects

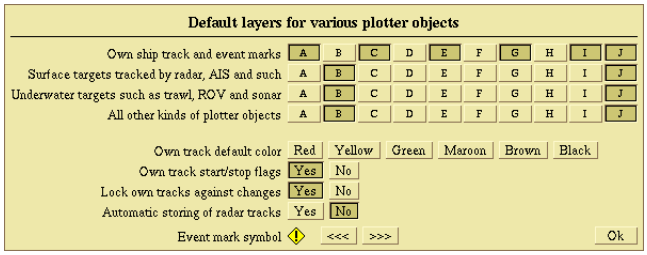
This settings can be changed by opening the panel named **Default layers for various plotter objects**.
Click Layers → Default settings for varoius plotter objects to open.



The 4 top rows of buttons defines the assignment for the plotterobjects.

It is possible to select several plot layers for each object, but all objects have to be assigned to at least one plot layer.

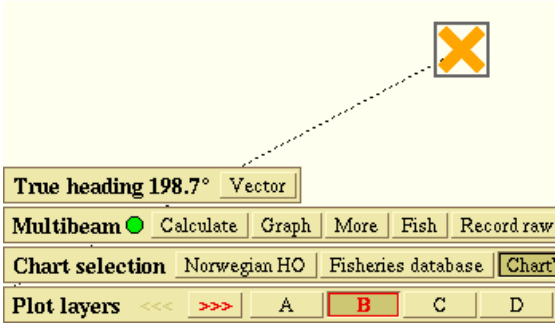
For this reason it is not possible to deselect a plot layer before selecting at least one of the other layers.



When finished editing, save any changes ond close the panel by clicking Ok.

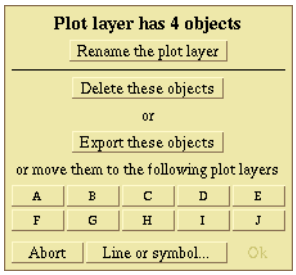
The plot layer panel

When an object is touched by the mouse cursor, the text and frame on the corresponding plot layer button will turn red.
.

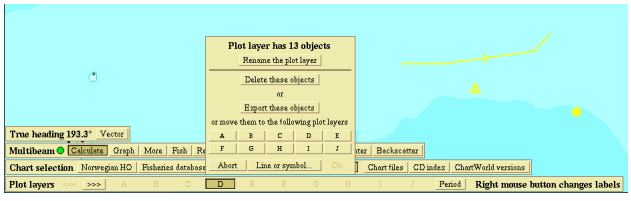


Open the plot layer panel by right clicking one of the plotlayer buttons.

This panel makes it possible to change layer assignment, plot layer name, and export data.

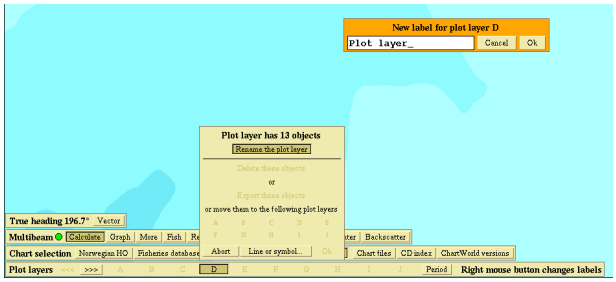


All objects assigned to this layer starts flashing when the panel is opened.

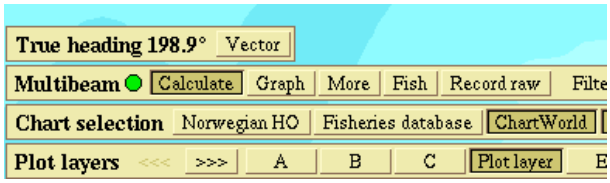


Rename the plot layer

The plotlayers are named with letters from A to J5, but can easily be renamed.
Click Rename the plot layer, enter the new name in the textbox and click Ok.



The new name now appears on the plot layer button.

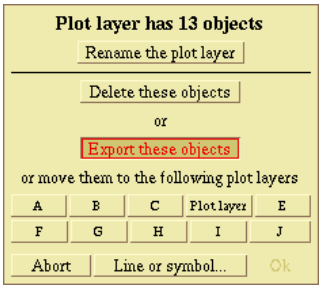


Delete plotter objects

Delete all objects assigned to a layer by clicking Delete these objects. Confirm when asked " Do you really want to delete all these plotter objects?".
It is possible to sort plotter objects, and delete only a selection. See also"Grouping identic objects" on page 22.

Export plotter data

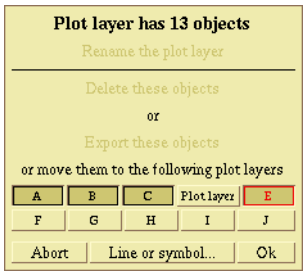
Plotterdata can be saved to locak dick or an USB device.
Click Export these objects, and select a location for saving the file.



Type a new file name, or use "olexplot.gz" as the system itself suggests.
Click Save, and confirm when asked " Selected plotter data - do you really want to save?"
It is possible to sort plotter objects, and save only a selection.

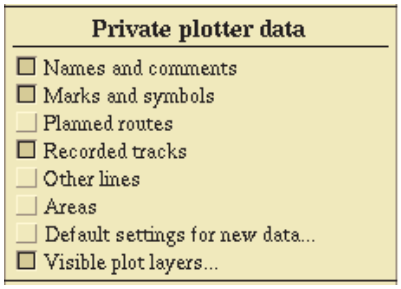
Reassign plotlayers

The plot layer assignment can be changed by clicking on buttons in the panel.



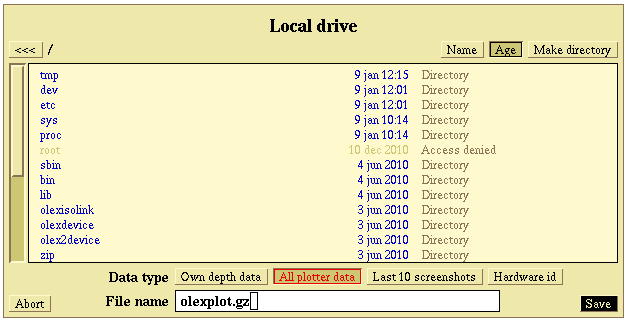
Plotterdata from old Olex versions

In previous Olex versions, the plotter data were divided into marks, routes, tracks, lines and areas. This objects was displayed by clicking the corresponding button for each object, in the Layers menu.If the computer contains old format plotterdata, the Layers menu will have checkboxes for using this data.



Save own plotter data

To save own plotter data, open the file browser either by choosing Settings → Save data to storage device. Select the device to store the data, and click All plotter data.

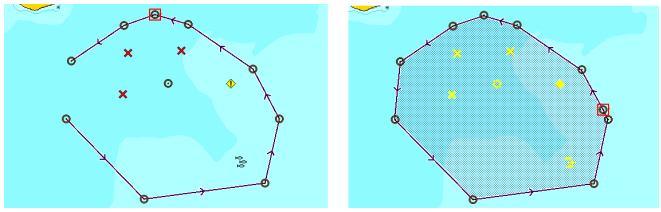


Sorting objects

Plotter objects can be sorted to delete or export a selection of objects.

Sorting objects by the use of an area

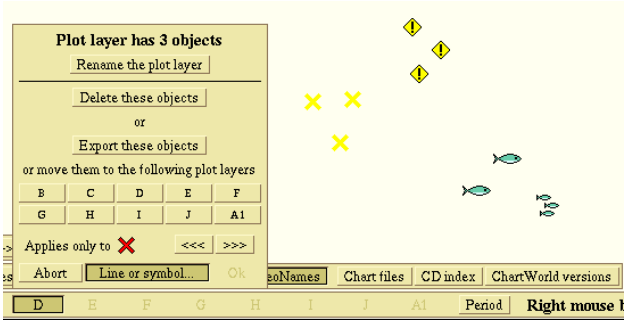
Create an area that includes the objects to be deleted or exported. Click Objects in the Edit Panel and the objects inside the area will begin to flash yellow.



Grouping identic objects

Objects with identic symbols that belongs to the same plot layer can be grouped by clicking Line or Symbol at the bottom of the **Plot layer panel**.
A new line opens, choose symbol by clicking on the arrow to the right or left. When the symbol is displayed in the panel, all identic symbols are displayed in yellow on the map.

.



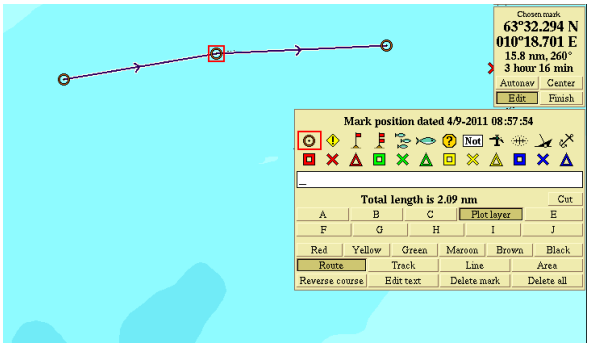
The objects can be exported, deleted, or regroup to other teams.

Split and join lines

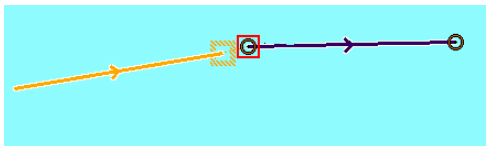
Split lines

A line object can be split into two or more line segments.

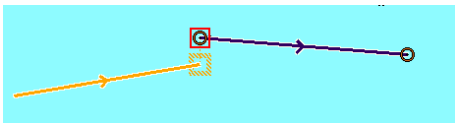
1. Click on an existing mark, or click somewhere on the line to create a new mark. Then click Edit in the Edit-panel to open the mark for editing.



2. Click Cut, and confirm when asked“Do you really want to cut this line?” A shaded box opens around the mark.



3. Grab the mark and drag it to a new location.



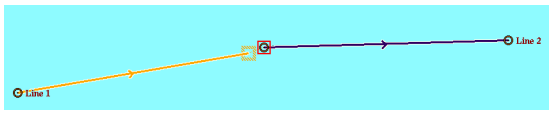
4. Now, there will be one mark at the end of each line. The two marks are connected with a dotted line while they are close to each other. When they are pulled apart, the line will disappear.

Join lines

Two line segments can be joined together to form a whole new line object.

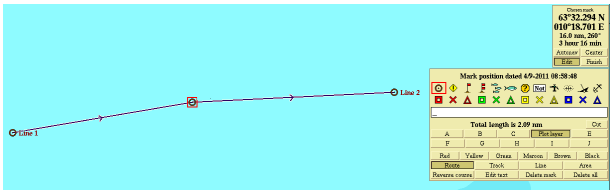
1. Grab the end mark on one of the lines to be joined.

2. Drag the box to the point where the lines should be connected.



3. When the lines are close enough, a dotted line connecting the two end points will appear, and a shaded box will open at the endpoint on the second line

4. Drop the box, and click Join in the **Edit-panel**.



A new panel with the text "Do you really want to join the lines together?" opens. Click Yes, and the two lines will now be joined together to form a whole line.

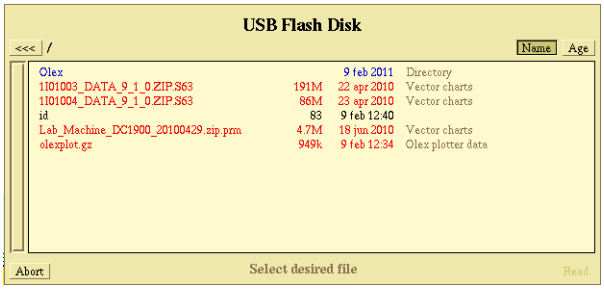
Export and import data

Different types of data can be exported or imported to the system.

Import	Export
• Software keys	• Plotter data
• Vector charts	• Depth data
• Plotter data from other Olex systems	• Screenshots
• Depth data from other Olex systems	

The Filebrowser

The filebrowser presents an interface for managing datafiles, and displays the files that are stored on the disk.



File names have different font colors depending of the type of file.

- Blue font - file directory
- Red font - files ready for import
- Black font - all other files

In addition, some of the files have a sub text showing the file extension.

Sorting directories and files

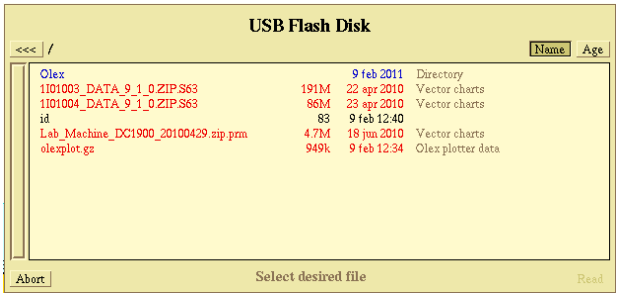
Files and directories can be sorted alphabetically or chronologically by the date they were created or modified. Note that file directories have a higher priority than files.

Click Name to sort the files alphabetically.

Click Age to sort the files chronologically, the newest file is placed in top of the column.

File navigation

Click once on the directory name to access a directory.



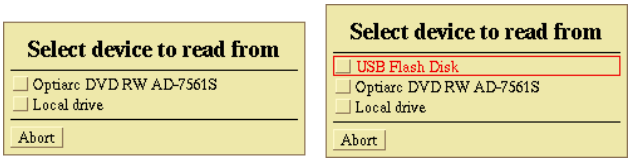
Click on the arrow in the upper left to go back. The path, to the right of the arrow, shows where a file is located in the file hierarchy

Import files

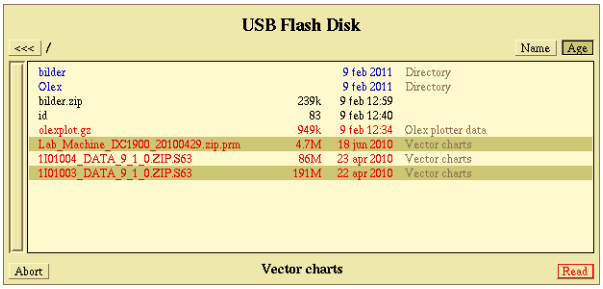
Connect a USB device to one of the slots on the machine. Click Read from to open the filebrowser, or Ignore to close the panel.

Or click Settings → Read data and software.

An overview of the available devices opens. An USB device can be connected, even if the panel is already open.



Select a device to open the filebrowser window.

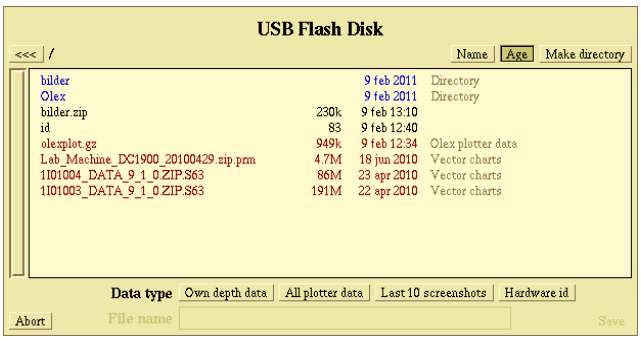


Select the file(s) and then click Read to import the files.

Export files

Connect a USB device to one of the slots on the machine. Click Write to to open the filebrowser, or Ignore to close the panel.

Or click Settings → Save data to storage device. Select a device to open the filebrowser window.



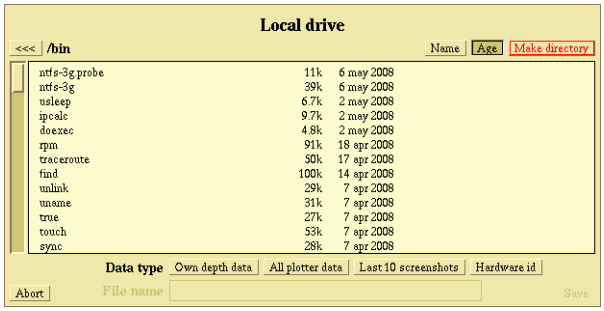
Select the type of file to be saved, Own depth data, All plotter data, Last 10 screenshots or Hardware id.

Rename the file or leave the suggested name unchanged, than click Save.

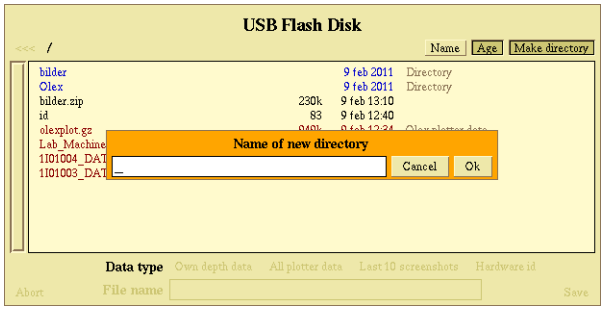
Storage of different types of files are described in their corresponding sections.

Create a directory

To create a new directory, click Make directory in the upper right of the filebrowser.



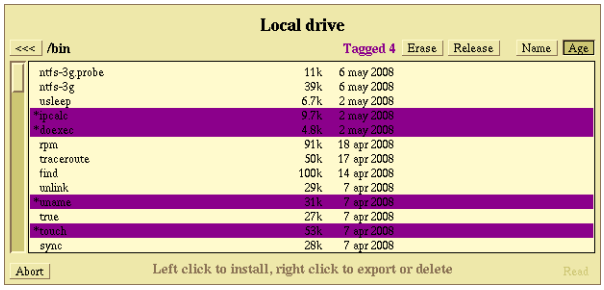
Name the directory, and click Ok to save.



Copy and move files

Files on the computers local drive can be copied or moved to other locations.

Open the file browser and select the files to be copied by right clicking the filename. The selected files are highlighted in purple.

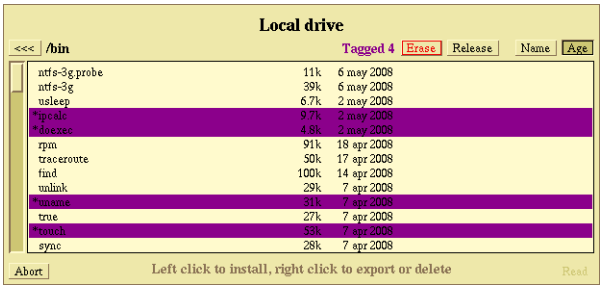


Two new buttons named Erase and Release opens in the upper part of the file browserwindow.
The number of selected files are displayed to the left of the buttons.
Open the location where to save the files, the files will still be highlighted even if the filebrowser is closed.
Click Release, and the files are noe copied into the new location.

To move files in stead of copying, go back to the original location and delete the original files.

Delete files

Open the filebrowser and select the files to be deleted. Click Delete and click Yes ,when the warning “Beware! Do you really want to erase files?” opens.



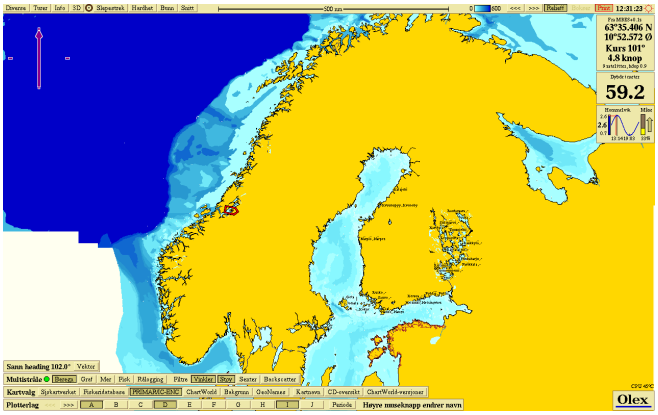
If you confirm to delete the files, a new warning opens, “Files are IRREVOCABLY erased! Shall we continue?”, click Yes and the files are deleted.

Files that are deleted from the system can not be restored!

Navigational charts

Both official electronic vector charts - ENC'er, and commercial navigational charts can be used in Olex.

The charts can either be purchased from local suppliers or directly from the chart provider.



Electronic navigational charts are available in different formats, Olex uses the following:

S-57 is an international standard for navigational charts that is approved by the IHO - The International Hydrographic Organization.
Most of the chart types used in Olex, follows the S-57 standard.

The charts can also be encrypted.

S-63 is a standard for encrypting and securing electronic charts. Charts using this format consists of an encrypted chartfile, and a permitfile.

In addition, navigational chart systems are divided into official and commercial navigational charts

Official charts are the electronic navigation charts recommended by the authorities.
The charts are updated regularly, and are the best and most accurate charts for navigation.

This charts usually consist of a set of base-CDs that contains the map files, and these charts are updated regularly.

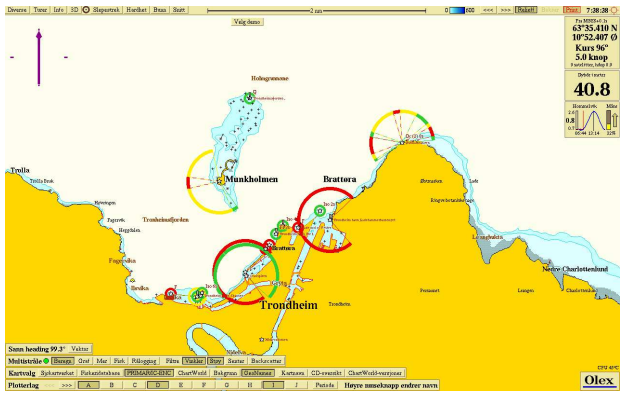
Most official charts are sold as subscriptions, and the charts must be deleted from your computer when your subscription periode expires.

Commercial charts are updated sporadically, and may therefore have slightly less accuracy.
The commercial charts are often a better option when it comes to price.

Chart types

PRIMAR and IC-ENC - International Centre for ENC's

ENCRYPTION: S-63
STANDARD: S-57 v.3
OFFICIAL: YES
COMMERCIAL: NO

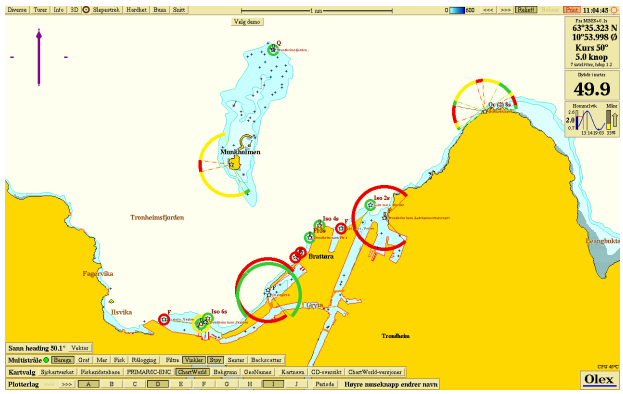


PRIMAR is a Norwegian regional coordination center that is operated by the Norwegian Hydrographic Service, and provides official charts worldwide.

IC-ENC is an international center for official electronic navigation, and provide official charts worldwide.

Chart Word

ENCRYPTION: S-63
STANDARD: S-57 v.3
OFFICIAL: YES
COMMERCIAL: YES



Provider of both official and commercial charts worldwide.

NOAA

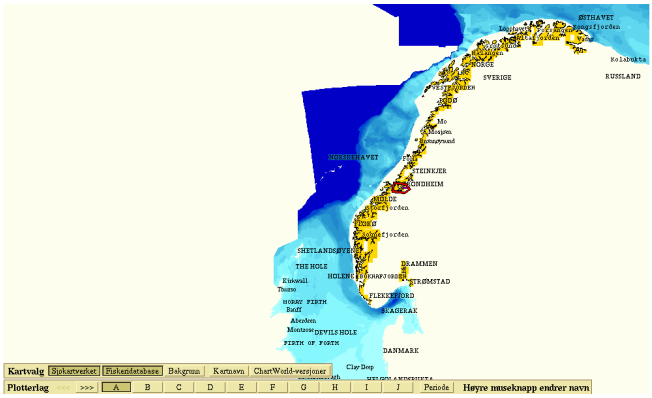
ENCRYPTION: No encryption
STANDARD: S-57 v.3
OFFICIAL: YES - free
COMMERCIAL: NO

National Osceanic and Atmospheric Admistration is an american organization that provides official nautical charts for the U.S. and some other parts of the world.

The charts can be downloaded for free, but the rights for use are regulated by NOAA.

Norwegian Fisheries Database

ENCRYPTION: Encryption key file in Olex
STANDARD: NSKV
OFFICIAL: NO
COMMERCIAL: YES



The Norwegian Fisheries Database is created by the Norwegian Mapping Authority.

The charts are available from the provider.

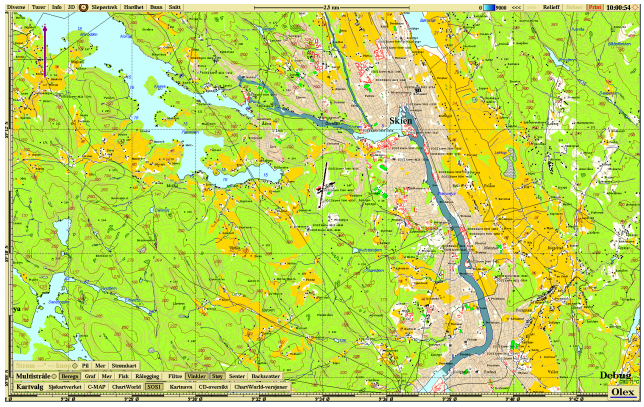
NSKV

ENCRYPTION: Encryption key file in Olex
STANDARD: NSKV
OFFICIAL: NO
COMMERCIAL: YES

The charts are older electronic navigation charts for Norway, and are no longer updated.
The maps can be purchased by contacting Olex.

SOSI

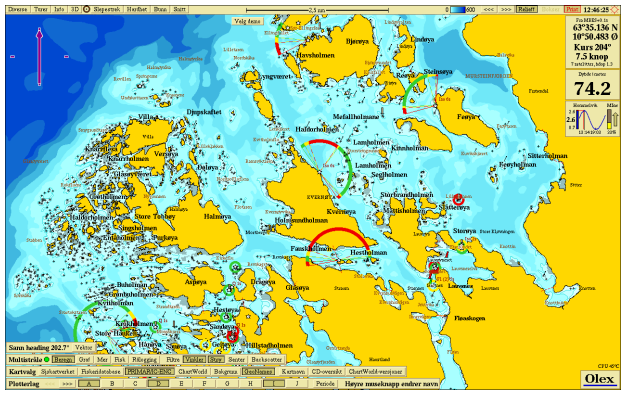
ENCRYPTION: No encryption
STANDARD: SOSI
OFFICIAL: NO
COMMERCIAL: YES



SOSI - “Samordnet Opplegg for Stedfestet Informasjon” (“Coordinated Arrangement for Localized Information”) is a data format developed by the Norwegian Mapping Authority.
SOSI maps are not intended for navigation, but can be used for additional information where there are no charts or where navigational charts are not good enough.
I.e. surveys done in lakes or rivers.

GeoNames

Geonames is a geographical name database that contains names throughout the world.
The database is pre-installed in Olex and can be used in addition to the chart names.



Buying and installing charts

The maps can be purchased either from distributors or directly from chart provider.

Remember to save the original chartfile and permit after installing the charts!

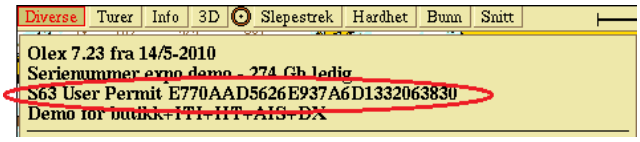
When updating Olex version it will sometimes be necessary to reinstall the chart files.

Encrypted chart systems

Encrypted chart systems usually consist of one or more chart files, and a permitfile for installing the chart files.

Permit file

All Olexsystemer has an unique *S-63 User Permit* to be found in the **Settings menu**.



This is an unique ID that identifies your computer, and which must be provided to the chart provider to receive the necessary permit file.

Chart files

Chart files can either be downloaded from the chart providers website, or chart files can be sendt by mail depending on the chart providers routines.

Map files can be .iso or .zip files.

Iso files are files that represents a copy of the complete file system, usually a CD. File permissions and other metadata will not be lost in the transfer of the iso files.

Zip files are files that are compiled and compressed to save disk space.

Installing charts

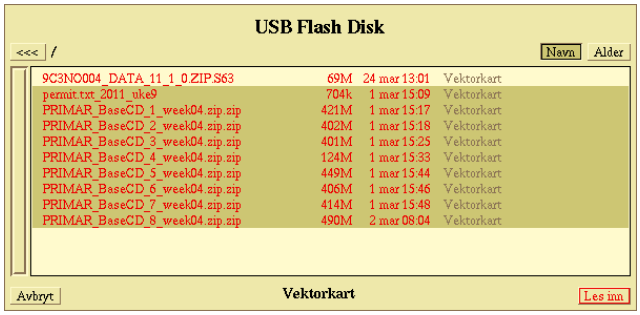
Save the chart - and permitfiler to a memory device, and connect to the machine.

Installing chartfiles in Olex is done in the same way, independent of the chart system.

Clich Read from and select the USB device to open the **Filebrowser**.

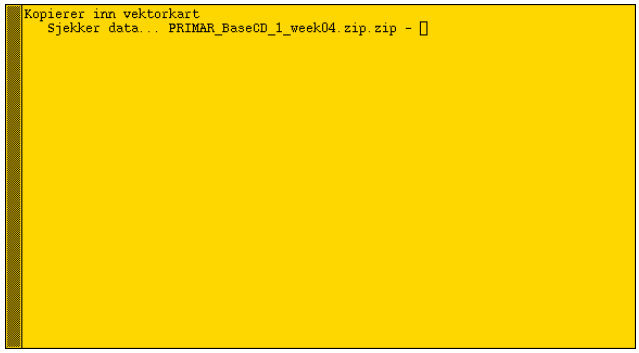
Highlight the chart - and permitfils by clicking on them, and then click Read.

Confirm when asked "Vector chart - do you really want to read? ".

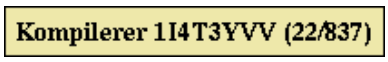


The computer will read the permitfile first and then continue with the chart files.

The yellow status window shows the installation progress, and eventually any rror messages if there are problems with the install.

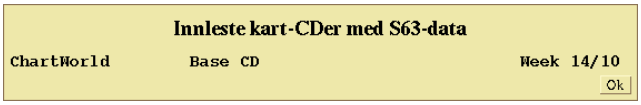


Once all the chart - and permitfiles are read the machine starts comliping the charts.
Each of the chart areas consists of several smaller cells, and the progress is shown in panel at the top left.



While the chartfiles are compiled, a button with the chartsystems name is added to the button row down in the left corner of the screen.

The button CD-index opens a panel with an overview of the base-CD's that are installed.



The button Chart files opens a list of which chart cells that are used in the visible screen.
The charts can be switched on and off by clicking on the check box to the left.

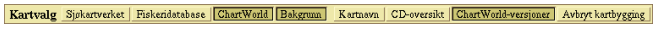
Updating charts

When a chart update is available, install the chart file to thesystem in the same manner as the initial installation.

Some updates may require a new permit, this is available at inquiry to the chart supplier.

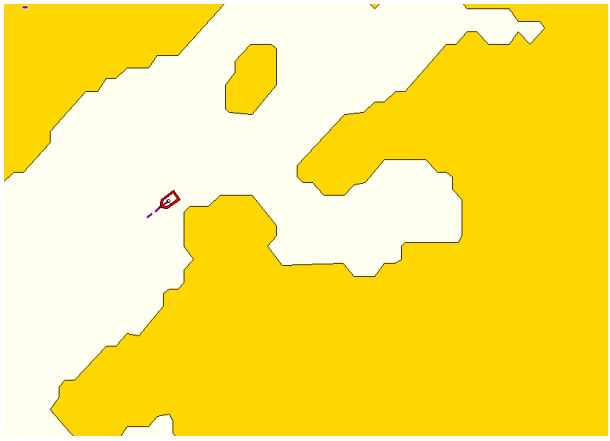
Chart overview

The row Chart selection shows an overview of charts that are installed on the machine.



The charts can be turned on and off by clicking on the button for the respective chart system.

Background turn on and a chart showing the landcontours. This chart is preinstalled on the machine.



GeoNames turns on and off the display of the name database.

Chart files displays the chart files used on the visible screen.

CD index shows the base CDs that are used.

ChartWorld-versions displays an overview of the chart world-charts that are installed.

Deleting charts

To delete charts, click Layers → Chart catalogue → Uninstall vector charts.

Choose the chart to be deleted.

And answer Yes to the question of "*Beware! Do you really want to remove the vector charts*? "

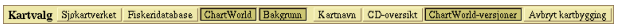
Answer Yes to the question of" *This will REMOVE charts and permitfiles! Shall we continue?* ".

A red status window opens and shows progress in the removal of the charts.
The window closes again when the charts are deleted.

Using navigational charts

Visualization

The chart line down in the left shows which maps are installed on the machine.



The charts are turned on and off by clicking the button the respective og the chartsystems.

The background chart and GeoName are installed on the machine by delivery.

The charts consist of layers with different levels of detail. When zooming out or in, the view changes automatically between the different layers.

If the function Layerss → Auto chart selection is turned off, a button row opens at the top of the screen corresponding to the different layers.
It is possible to select which layer - detail level to be displayed.

Other chart features

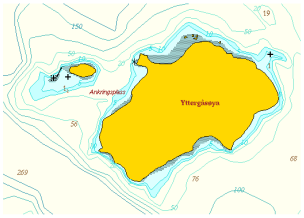
Hide depths

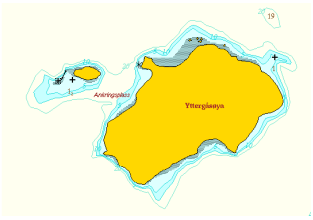
In the **Settings menu** there is an option for hiding depths of more than 10, 20 or 30 meters.

Only depths that is shallower than the selected number will appear on screen.

Click Setting →No depths below 10, 20 or 30 meters.

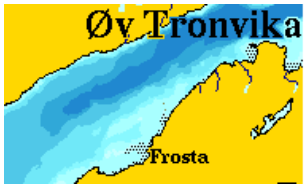
To always see all depths choose Disabled.

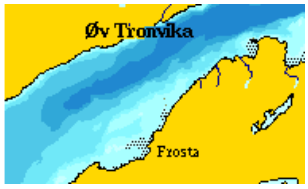




Small text and symbols

If the texts and symbols are large in relation to the chart view, click the Layers → Small texts and symbols.

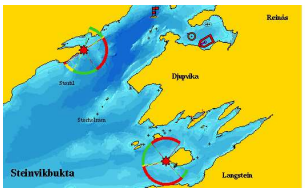


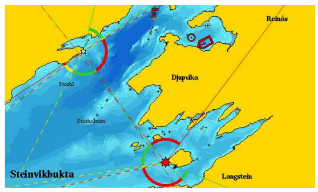


Animated lights

For easier navigation, lantern symbols are made that changes color according to which sector the ship is in.
The symbol will flash in accordance with lights flash characteristic, if the data can be found in the map.
Only lights that are believed to be visible from the ship will be active.
Activated the function by clicking Layers → Animated lights.
To see the light sectors and their sector lines, the function

Lights and light light sectors , and - their sector lines must be enabled.

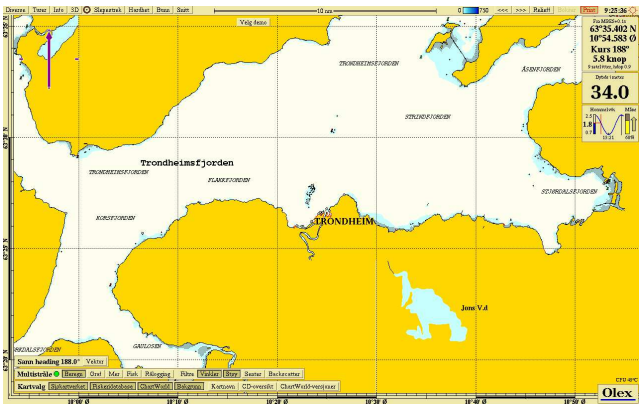




If the machine does not receive signals from GPS, all lights in chart will be flashing.

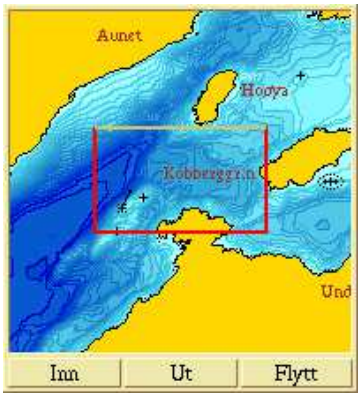
Grid lines

Click Layers → Grid lines to turn on a grid showing longitude and latitude.



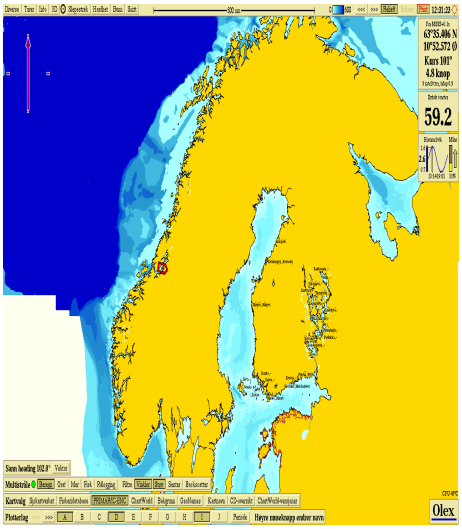
Overview Map

When the map is very zoomed in, it can be convenient to use the overview map. Click Settings Show movable overview map.



Vector chart data

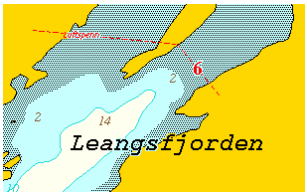
The Layers menu lists the various functions related to vector charts.



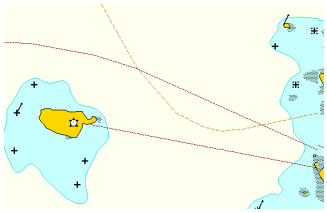
Symbol texts - turn off and on texts that are associated with symbols for the name of light houses, floating buoys, poles and etc.

Texts and names - turns on and names in the map, like names of banks, fjords and grounds.

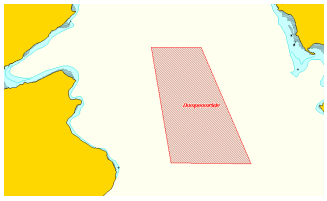
Depts and elevations - turn on and viewing of depths and heights.



Pipelines, submarine cables - pipelines and submarine cables are displayed with dotted lines.

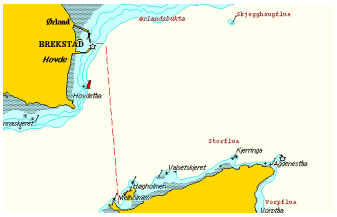


Restricted Areas - Showing areas that are subject to an order of restriction, it can be dumping areas or military practice areas.

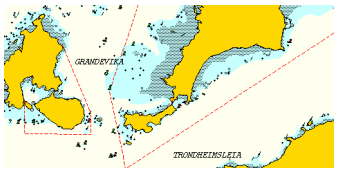


Various symbols - Turns and other types of symbols, like anchorages, shipwrecks or other obstacles.

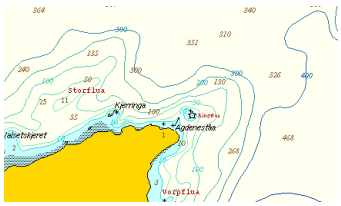
Navigation lines, ferry routes - Displays the ferry route with dotted lines.



Economic and political bourders - like port limits,municipal boundaries and other boundaries.

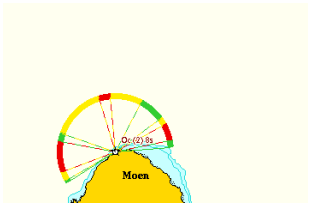


Depth contours and seabed types - shows the depth contours in addition to any depth numbers.

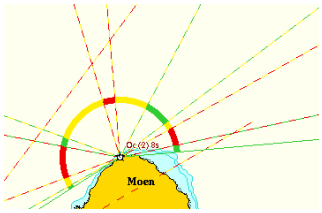


Depth Areas - shows the depth areas on the map with colors instead of depth contours.

Lights and light light sectors - turn on and off display of lights and sector lines.



- and their sector lines - shows the corresponding sectoral lines.



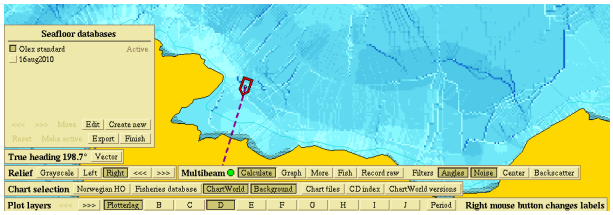
Databases

Seabed surveys creates a 3D terrain model, based on measured and calculated depth values. The data is stored in a *depth database*.

There are both "*self-measured depth data*", and "*shared depth data*".

"Self-measured data" are depth data measured by each of the user.

"Shared data[a] are depth values measured by Olex users wordwide.



Users submits their depth-data to Olex, where the data are processed and stored in one large data base. This database is updated several times a year.

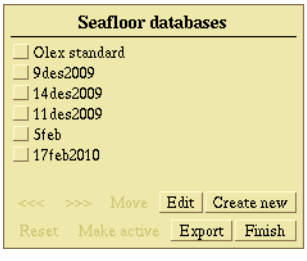
By submitting their own data, users will have access to regurlarly updated depth databases.

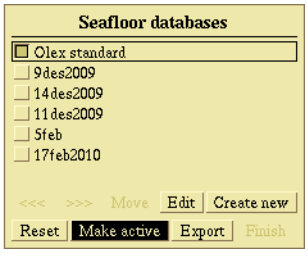
When buying a new Olex system, the newest version of the depth database will be preinstalled, if the user would participate in data sharing.

Database panel

Databases can be easily created, deleted, imported or exported by using the **Depth-database panel**.

Click Info → Select database to open. The upper part of the panel displays an overview of the databases existing in the system.
In the lower part, there are buttons with various functions.
The number of databases are limited up to 100.





Visible and active databases

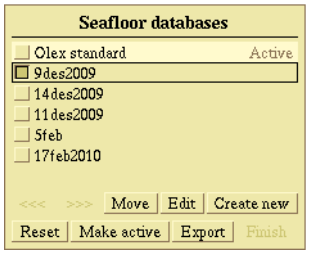
A database can be set *visible* and/or *active*.

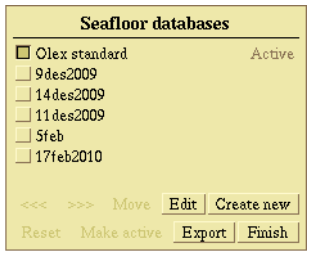
A database is visible when the seabed map is displayed on the screen. A database is set visible by clicking the name once. A black bourder around the name indicates which database that is visible.

All measured and calculated seabed data are placed in the actice database. One database must be active at any time. To activate a database;first highlight the name, and then click Set Active. The button starts blinking when the database is highlighted.

A panel saying "Do you really want to change the Bottom Calkulation to 'xxx'?[a] opens.

Click Yes to confirm, click No, or wait until the panel is closed to cancel.





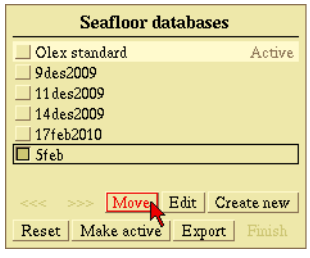
In the left picture, the database "Olex standard" is active, and "9des2009" is visible.

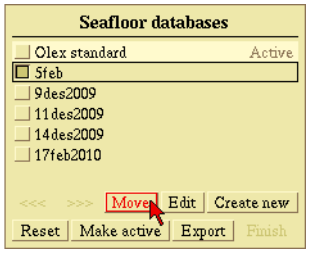
This means that the seafloor data is calculated and placed in "Olex standard". The seabed map displayed on the screen comes from the visible database, "9des2009.

In the right picture "Olex standard" is set as well as active and visible database.

Organizing databases

If the system contains several databases, it may be useful to organize them so frequently used databases are moved far up in the list. Select the database to be moved, and click Move to move it one step further up.

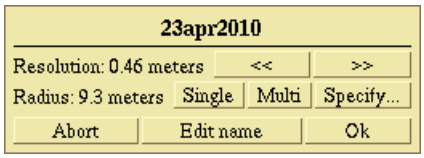




Create a new database

Click Create new, and a panel with some settings opens at the bottom left of your screen.

The new database is created as a copy of the visible database, the settings of the echosounder, resolution and radius are copied. The database is named with the date.



Setting parameters

Select Single if the system is connected to a single beam echosounder, or select Multi if connected to a multi-beam echosounder.
The system will suggest settings for "Resolution" and "Radius", it is recommended to use the suggested settings for best results. Parameters can be adjusted to the desired value.

“Resolution” determines the level of detail on the depth chart. By changing the value, the dimension of depth boxes changes. The resolution can be adjusted from 0.06 meters up to 50 meters, by clicking the arrow keys.

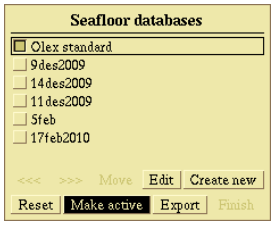
“Radius” specify the radius of the area calculated around a vertical ping. The radius is directly dependent on the resolution. (100 x dimension of the depth box).
Click Specify to change the setting for the radius, the resolution will change accordingly.

If you select a very high resolution, it may result in “holes” in the map.

By using a low resolution, the radius will be very large, and large amounts of data must be processed. A lot of system capacity will be spent processing data, and the system can be perceived to be slower.

Modify an existing database

When a database is created, only the name can be changed afterwards. Highlight the name and then click Edit.

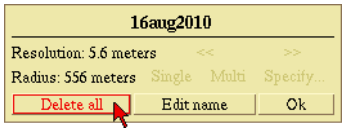


Click Edit name, and then enter the new name in the text box. Delete the old name by pressing "Backspace".

Click Ok to confirm, or click Undo to cancel. Click Ok again, this will save the changes.

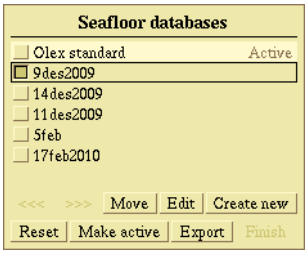
Delete a database

A database can be deleted if it's not set as active. Highlight the name, and click Edit. Click Delete All, and a warning appears saying "Do you really want to remove depth database 'xxx'?". Click Yes to delete, or click No to cancel.



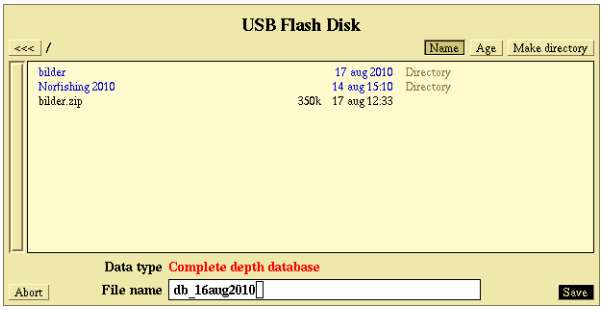
Export a database

A database can be exported to be saved to a memory stick or other storage device. All data can be easily imported into the system again.



Highlight the database to be exported, and click Export. A panel with available storage devices opens. Select a location by clicking on the device. The filebrowser opens, and Olex will suggest a name for the file.

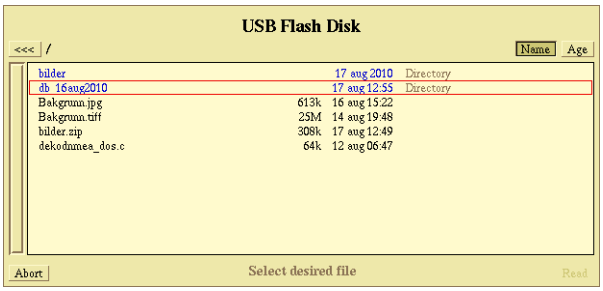
The name will be of the form “*db_xxx*” where “*db_*” is short for "depth database".



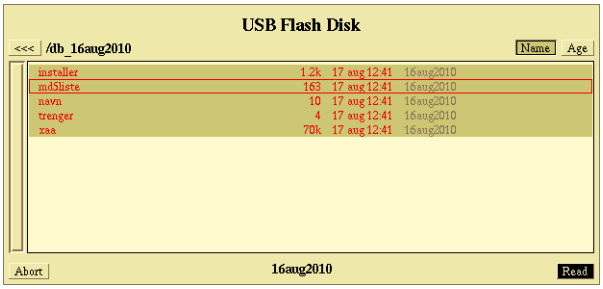
Click Save to export the database, and confirm by clicking Yes, when prompted "Complete depth database - do you really save?". A green panel with the text "Exports dybdedatabase 'xxx ' " is displayed while the database is stored, note that this may take some time since some databases may contain large amounts of data.

Import a database

Open the **Filebrowser** by clicking Settings → Read data and software, or connect a USB device. Click on the filename to open the database directory.

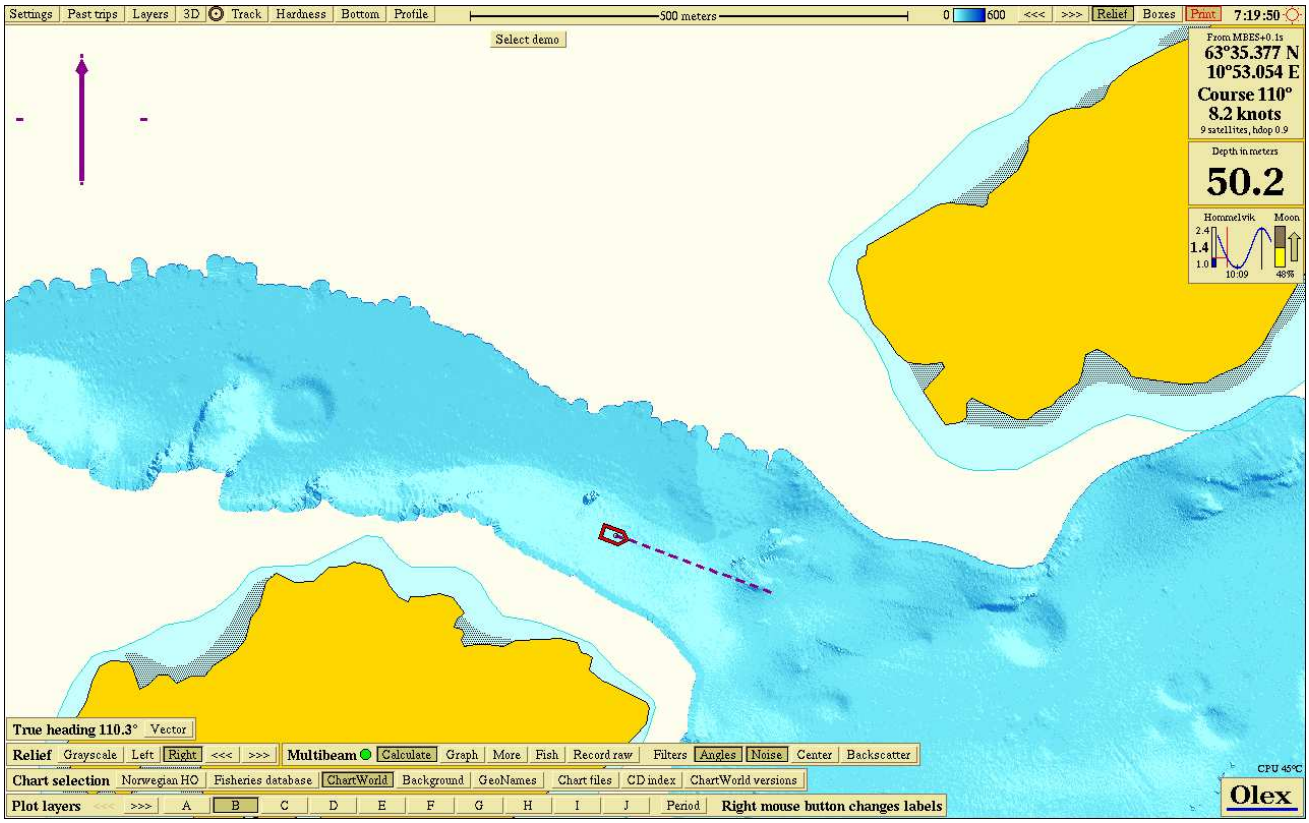


Highlight the files by clicking on any of the files. Click Read, and confirm when asked ´xxx - do you really want to read?”



The database will be added to the list when the import is ready.

Seafloor mapping



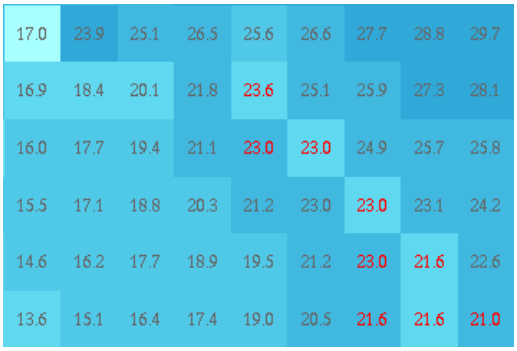
When Olex receivs signals from GPS and echo sounder, the system will automatically start calculation of seafloor maps. Position, bottom- and possibly hardness data, if available, are stored in boxes that are either measured or calculated. Depth data may come from various sources, such as single-beam echo sounder, echo sounders with hardness - ES60 , and multi-beam echo sounders.
See “Seafloor hardness - ES60” on page 65, “MBES - MultiBean Echo Sounder” on page 59 and “WASSP” on page 61.

Data can be imported and exported, via backup, data export, raw-data files and depth databases. The seafloor map can be displayed in different ways, with contours, relief, bottom hardness, bottom zoom and 3D. Any errors that occurs during the surveying can afterwards be removed in different ways.

The earth surface is divided into small squares, called depth boxes. Each box is 5x5 metres, unless a different resolution is chosen. This resolution is chosen to match the position accuracy of a conventional GPS. If a more accurate GPS is connected, the resolution can be changed.

A depth box can contain either a measured or a calculated value. When the echo sounder receives a value, the value is stored in a deep box, and the system will calculate the depth values in a given radius around this.

By zooming in, one depth value is displayed in each depth box. Measured values are red and calculated values are dark gray.



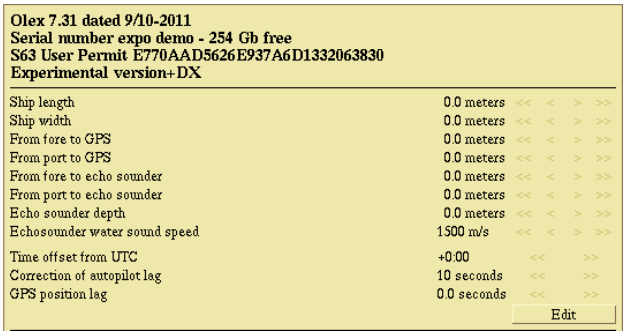
By activating Boxes in the main menu, it is possible to see the values of the vertical soundings, which will be either red or yellow. Depth boxes with red numbers contains data from the Olex shared database, and yellow numbers are self-measured depth values.
If Settings → Show calculation progress is turned off, all numbers will be red.
The quality of the seafloor map depends on how many depths that are measured. The more depths measurements in the same area, the better the serafloor map.
If the same depth box is measured several times, the most shallowe value is used.

Create seafloor maps

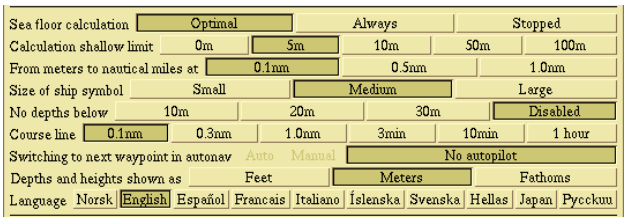
Depth data is the basis for the seafloor maps, and may come from various sources.

Single beam echo sounder

To get the best possible result of the seafloor mapping, it is important to set the correct parametres for the sonar depth, sound velocity and location of the depth sounder. In addition, values for the GPS and the boat's geometry must be set. Click Settings → Edit and use the arrow keys to change the values.



Different parameters can can be set to optimize the calculation.



Seafloor calculation

- Optimal - performs a quality check before the values are used in the calculation.
- Always - uses all depth values.
- Stopped - turns off the calculation.

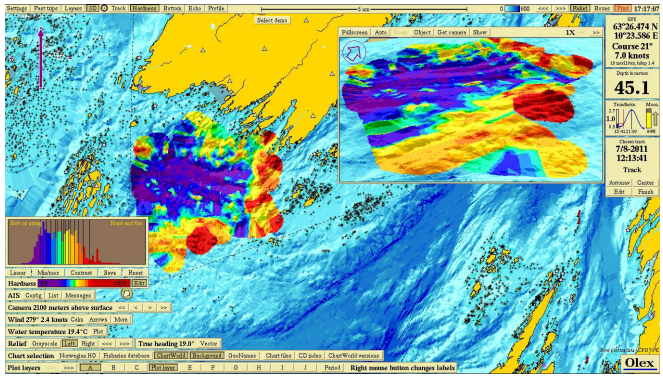
Seafloor calculation should normally be set to “Optimal” for a best result.

Calculation limit

Sets the upper limit of depth values to be used for calculation. This should normally be set somewhere between 5 metres and 100metres.
Appropriate recommendations may be 5m or 10m.

Echo sounder with bottom hardness

On the basis of raw data from the echo sounder, Olex calculates the seabed topography and hardness. This is done based on the seabeds ability to reflect sound, adjusted for factors that may affect the measurements.
Without HT-software, the data will be treated as data from a csingle beam sounder, where only the depths are transferred via serial cable.
The hardness is displayed with colors. Each color representing a hardness value. Turn on the hardness view by clicking Hardness in the main menu.



The hardness is expressed in percentage, where 0 % is completely soft and 100 % is maximum hard. The hardness of the last recorded sounding appears in a separate panel to the right. The hardness value is also displayed in the depth flag that appears when the mouse pointer moves around the in the screen. See also“Seafloor hardness - ES60” on page 65.

Multi beam echo sounder

Multibeam echo sounders are used primarily for surveys and seafloor mapping, providing a significantly better accuracy than conventional single-beam echo sounders. On the basis of incoming position- and depth data ,Olex can calculate the seafloor map. Measured and calculated dept data are added continuously to a depth database

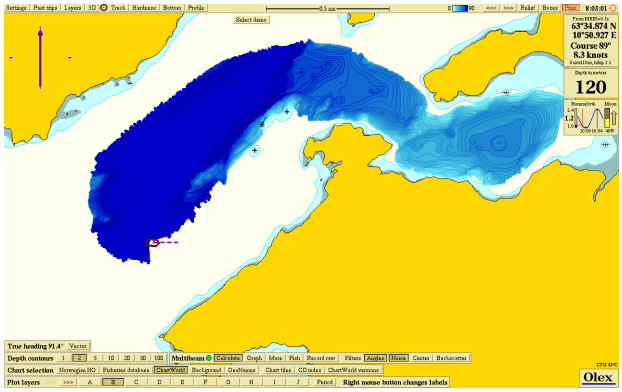
More information see “MBES - MultiBean Echo Sounder” on page 59, “WASSP” on page 61 and “Databases” on page 37.

Visualization

The self-measured seafloor map can be displayed in different ways, with contours, relief, bottom zoom, 3D, or profile. To turn on and off the seafloor map view, click Layers → Show caclulated seafloor map.

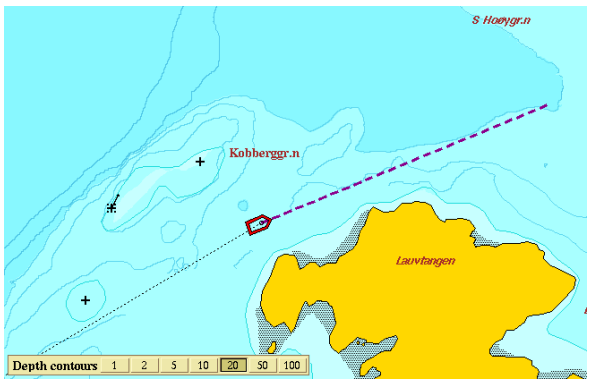
Contour lines

In traditional presentation, the seafloor map, with contours or depth numbers, is displayed on the screen. The seafloor map is displayed in blue tones, ranging from bright blue that means shallow areas, to dark blue that means deeper areas. The colors are allocated from the surface down to a certain depth value, which can be set in the menu bar. All seafloor deeper than this value gets the darkest shade of blue.



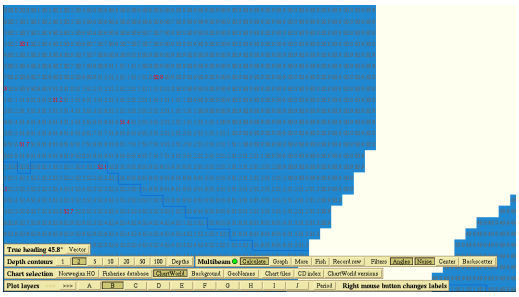
The depth range is set by clicking the arrow buttons on the main menu, minimum depth is 5 meters and maximum depth is 9000 meters.

Equidistance - the depth difference between each contour line, automatically adjusts the selected depth range.
The equidistance can also be set manually by clicking on the value in the depth contour panel at the bottom of the screen.



If the map is zoomed in enough, a new button, Depths, is added to the depth contour panel.

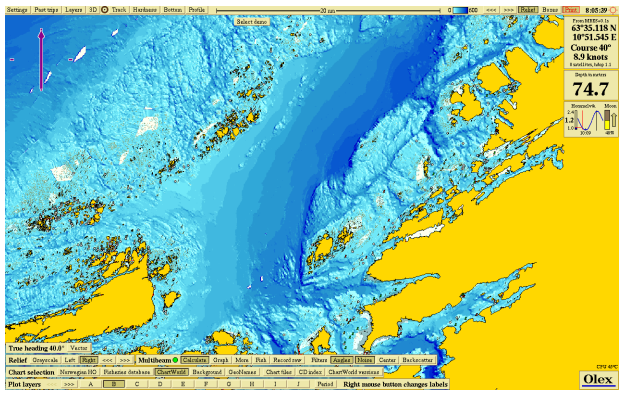
By clicking this, the numerical values of the depth of the boxes will be visible on the screen instead of contours. Depths and contours can not be displayed simultaneously.



The map will still have the same colors for the depth areas.

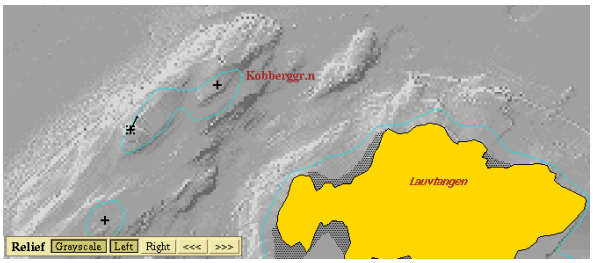
Relief

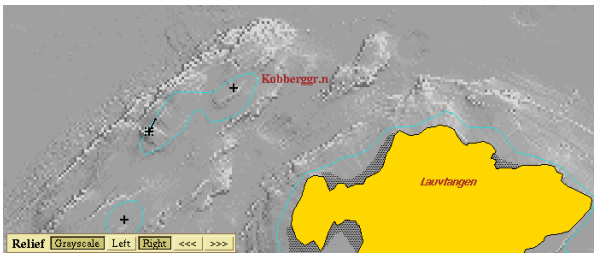
This function is activated by clicking Relief on the top menu. Depth countours are displayed and visualized by the use of light and shadow. This displays edges and countours, and the detail becomes more visible. A good relief view, depends on if the area has a well-measured seafloor map.



When Relief is activated, a control panel opens in the lower left corner.

Greyscale displays the Olex map in gray colour, with only light and shadow.
By clicking Left or Right, you can select the light falling onto the map from the left or right side.
This brings out details that might otherwise be difficult to detect. The arrow keys <<< and >>> , are used to increase or decrease the image contrast.



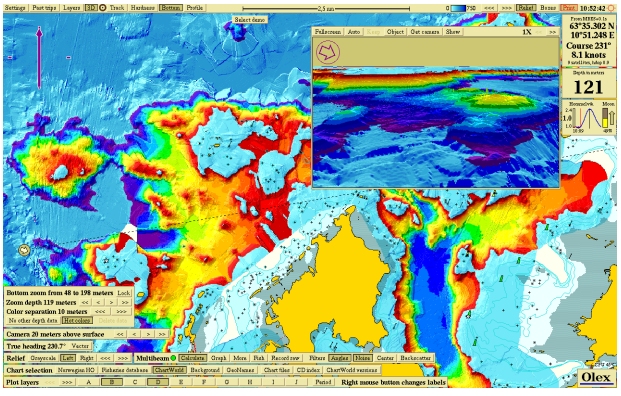


The images displays the same map with relief in grayscale. The first picture is the light in from the left, and the last light coming in from the right.

Bottom zoom

The Bottom zoom function is used to view certain areas in greater details. By activating Bottom in the top menu, the seabed where the depth falls within a certain range, is displayed in details.
This presupposes that there are already seafloor maps in the area. Areas without seafloor maps are shown as white .

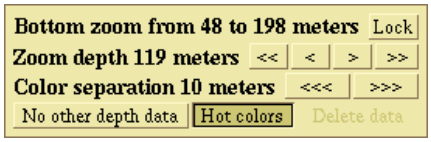
Special colors are used to distinguish the bottom zoom range from the rest of seafloor map. Bottom zoom depth range has an upper and a lower depth limit, centered around a center depth. The center depth is either the depth beneath the vessel, the depth below a mark or it can be set manually.
The depth range between each color is adjusted by using the the arrow keys in the bottom zoom panel.
By changing the color range, the bottom zoom depth range changes correspondingly.



Bottom zoom has several uses:

- visualization of formations.
- highlight contrasts between depths.
- removal of sounding errors.

By clicking Bottom in the top menu, the *bottom zoom depth range* is displayed on the screen and the bottom zoom panel opens.



The settings for the bottom zoom range is defined at the top of the panel. A higher color separation, means a broader zoom range.
By clicking on the arrows that change the color separation, one will see that the bottom zoom range depends on the color separation.

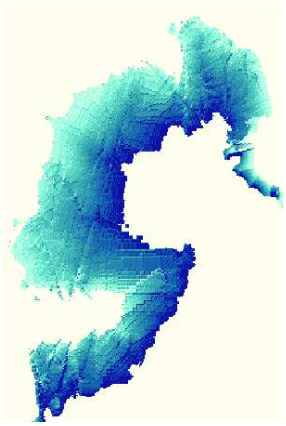
The centre depth is changed by clicking the arrows, << and >> changes the depth by 10 meters for each click, while < and > changes the distance by 1 meter.

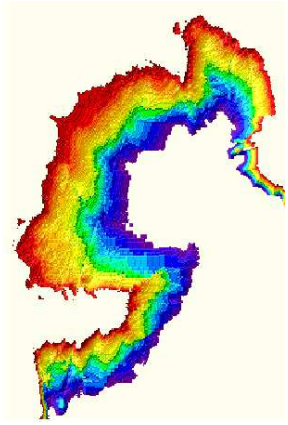
When the bottom zoom depth range is set, the parameters can be stored for later by clicking Lock.
When Bottom is activated later, the previous settings are recalled.

If Lock is activated when the panel opens, it means that manual mode was used the last time the bottom zoom feature was used.

No other depth data turns off and on all other colors than the bottom zoom colors.

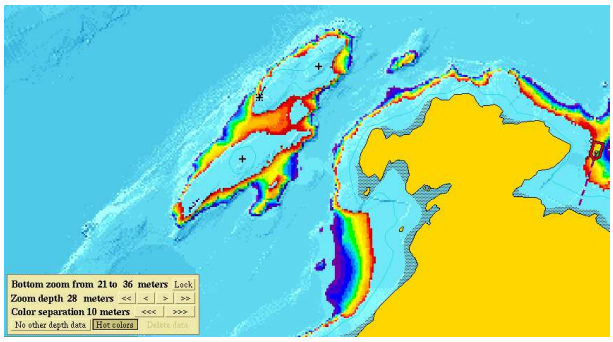
Hot colors change the color spectrum from cool blue tones to warm colors.

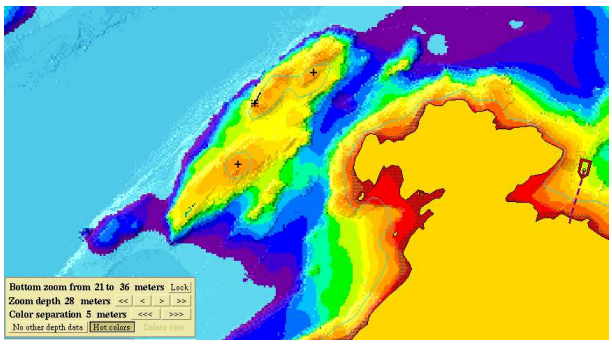




Color separation

15 colors are distributed evenly in the bottom zoom depth range. Each depth range is assigned to one specific color. If the color separation is set to 1 meter, this means that depth areas that have less than 1 m depth difference will have the same color. Bottom zoom range will be 15 meters.If the color separation is increased to 5 meters, the depth areas that varies by less than 5 meters, will have the same color. And the bottom zoom range will be 75 meters.
The color distance is adjustable from 0.1 to 500 meters.





On the first picture is the color space set to 1 meter, on the other photo the color separation is increased to 5 meters.

Zoom depth

The zoom depth can be specified in several different ways.

A mark determines the zoom depth

Select an existing mark, or place a new mark. Click the Bottom button in the main menu. The depth below this mark now determines the zoom depth.
If the mark is moved to a deeper or shallower water, the zoom depth changes, and hence the bottom zoom range.

After the zoom range is selected, click Lock to keep the setting. The selected mark can then be closed for editing by clicking Finish on the chosen mark panel.

Setting the zoom depth manually

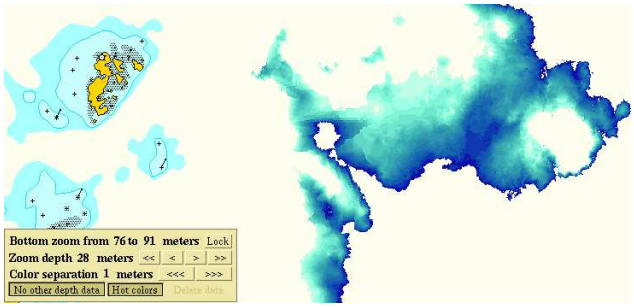
An other way to set the zoom depth, is to adjust it manually by clicking the adjustment buttons on the panel. Notice that the Lock button will be activated automatically when adjusting the settings. The button must be pressed again to return to zoom depths determined by the ship's position, or a mark.

Zoom depth below vessel

Instead of using a mark to determine the zoom depth, and the zoom depth has not been set manually, the depth below the ship at any time determines the zoom depth. This is indicated by that the zoom depth changes constantly, as the ship sails ahead.

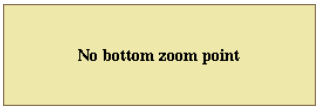
No other depth data

This function turns off the the seafloor map view, displaying only areas with bottom zoom colors.



No zoom bottom point

If a mark is placed somewhere outside the measured seafloor map, the zoom depth cannot be determined, and the message “No bottom zoom point” will be displayed.



Profile

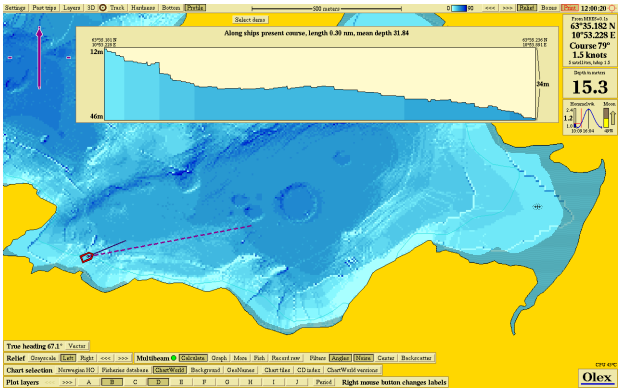
Click Profile in the main menu, to open a section or profile picture of the seabed:

- Along the ship's course line
- From ship to a selected mark
- Along a selected line object

The seabed profile displays the position for the start and end point, maximum and minimum depth, total height for the

entire depth of the profile, and the total length of the profile view.

The colors are the same as the colors on the contour lines, or possibly hardness colors.

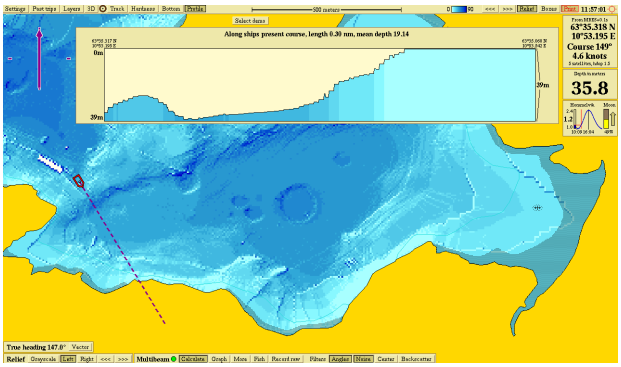


If the profile from the ship to a mark, or along the ship's course line is selected, the profile will be changing due to the ship's motion. The view is continuously updated as the coordinates changes.

When a profile along a route is displayed, the waypoints are displayed as bars with corresponding positions.The profile view has a fixed size, and the window is scaled to the length of the view. I.e. profiles in the same area may give different views depending on the length of the profile.

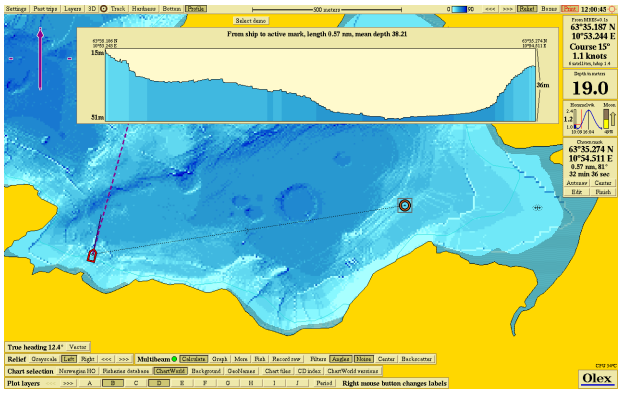
Profile view along the course line

The profile views a cross-section along the vessel's course line, and is updated continuously as the vessel moves forward. The length of the course line can be changed by selecting Settings and select a value for the length of the course line.



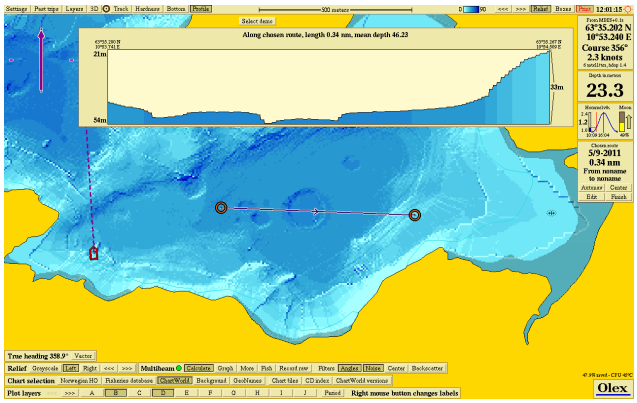
Profile view from the ship to a waypoint

The profile views a cross-section along the line from the ship to a selected waypoint. Grab and placed a new mark, or click on an existing mark. The mark can be moved around and the profile view will be updated continuously.



Profile view along a line object

Select an existing line object, or create a new one. The profile along the line object is viewed.



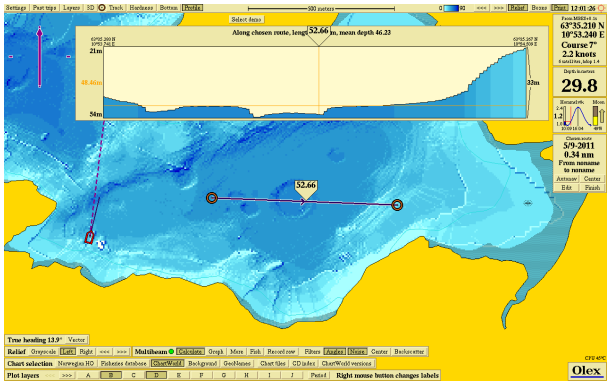
Change the coordinates

If a line object is selected, it is possible to change the coordinates by moving the waypoints. The profile changes while the waypoints are moved around in the map.

Create marks in the 2-D map

By moving the mouse pointer inside the profile view, a flag that shows the depth opens both in the profile view and on the

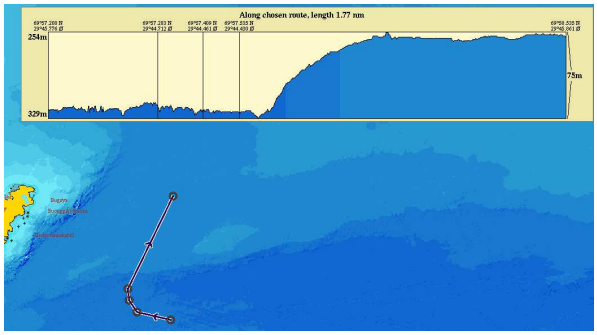
map.Click inside the profile view, to place a mark in the 2D



view.

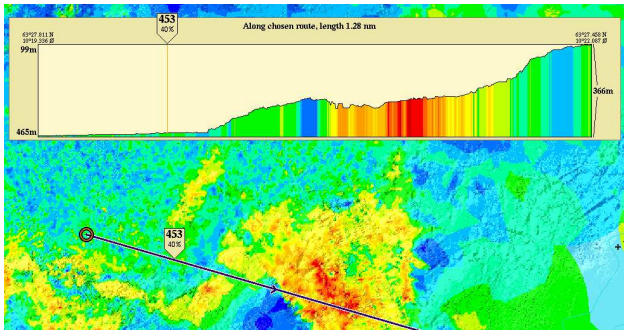
Path planning

It is possible to plan routes for piping, cables or other objects on the seabed. The method can also be used to plan for trawl-haul, or find for finding an appropriate place for net and line sets. When the marks are placed, they can be moved around afterwards to find the best location.



Profile and hardness

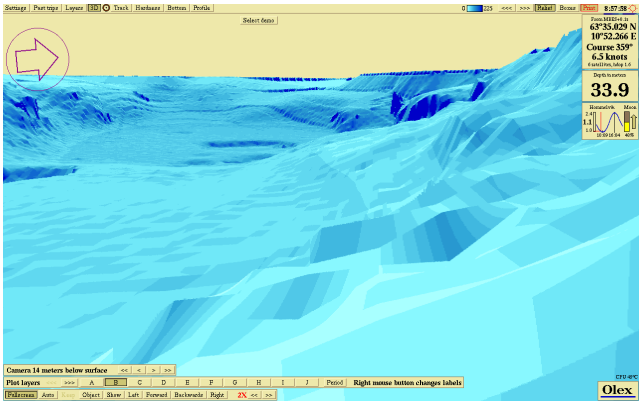
The profile can also be displayed with hardness colors.



3D

New perspective 3D

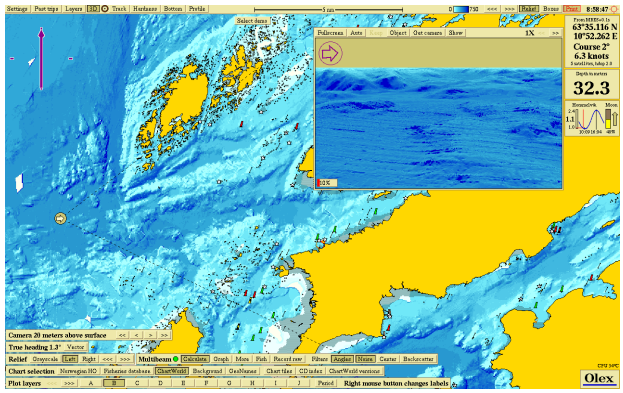
This 3D view is also activated with the button 3D in the main menu. The seabed is made in true perspective by using a virtual camera. The camera can be moved around the landscape, and so it is possible to study the terrain from different angles.



3D image can be displayed in a separate window in the 2D map, or it can choose full screen.

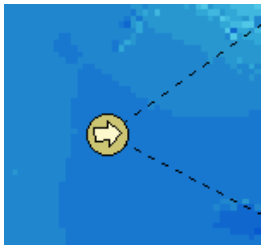
Controlling the camera

Select a view that includes the area to be displayed in 3D. Make sure that Layers → New perspective 3D is turned on. Select 3D from the main menu and the window with the 3D view opens.



At the top of the window is a row of push buttons, start by selecting Get camera.

The camera symbol appears in the 2D map, on the left half of the screen. Dashed lines delimiting a sector shows the camera view and the arrow shows the direction. The camera can now be moved around in the screen by grabbing it and dragging it to the desired location. The 3D window shows the camera's field of view.



Horizontal view

At the top left of the 3D view, is a directional arrow showing which way the camera is pointing.

Grab the arrow and turn it around to rotate the camera's field of view. The 3D image will revolve around the camera axis. The same function can also be performed by pressing and holding the middle mouse button or the scroll wheel, and than move the mouse sideways.

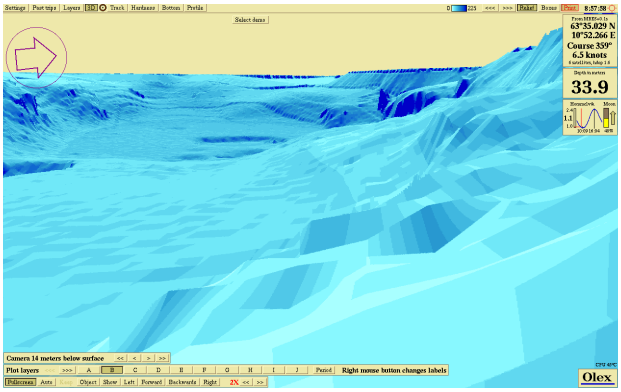
Vertical view

Press and hold the middle mouse button or scrollwheel, and move the mouse pointer up and down to move the angle of view vertically up and down. The camera can also be raised and lowered in height.

It is not possible to lower the camera more than 20 meters above the sea floor, although a lower level is chosen. Furthermore, the camera can be raised several thousand feet above the water. As a rule, the best results is be given by raising the camera is raised a little above sea level.

3D full screen

The button row at the top is used for adjusting settings for the 3D view.



By clicking Full Screen a 3D full-screen view is opened. It is now possible to move around and get a complete overview of the terrain. The button row at the bottom of the screen contains button for navigation in the 3D screen.

- Auto - When selecting Auto, the camera will follow the ship at a set angle at all the time. Distance to the ship will vary with the depth. The perspective is changed when the ship sails into shallower or deeper water.
- Keep - The camera can be adjusted to follow the ship from a certain position. Set the desired position for the camera, and then click Keep. The camera will now follow the ship in the position is set. To get the camera back to its normal position, just disable the feature.
- Object - Place a new mark in the 2D map and select Object. The camera is automatically rotated so it points towards the object. The camera will move so it will always point towards the mark. The mark must be chosen and editable.
- View - To view all waypoints and line objects found in the area. click Show.
- Left - the camera moves laterally to the left.
- Forward - the camera moves forward.
- Backwards - the camera moves backwards.
- Right - the camera moves laterally to the right.

Combining features

It is possible to combine several functions:

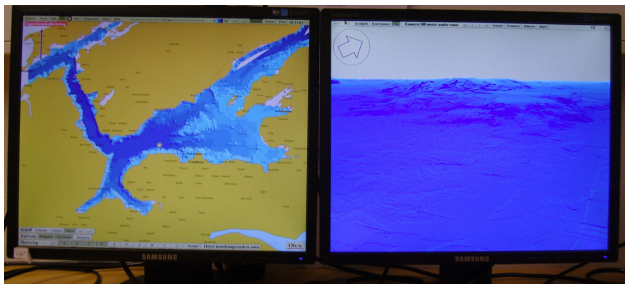
- Select Oject, then click and hold Left or Right. The camera will now point to the mark while walking in circles around.
- Select Auto, then click and hold the Left or Right. The camera will now point towards the boat while walking in circles around.

The topography can be changed by clicking the arrows in the button row. If 2X is selected, the depth differences are doubled so that small differences in elevation of the terrain is evident.

Split 2D/3D

If the machine has 2 monitors connected, the screen configuration can be chosen so the right screen shows the 3D

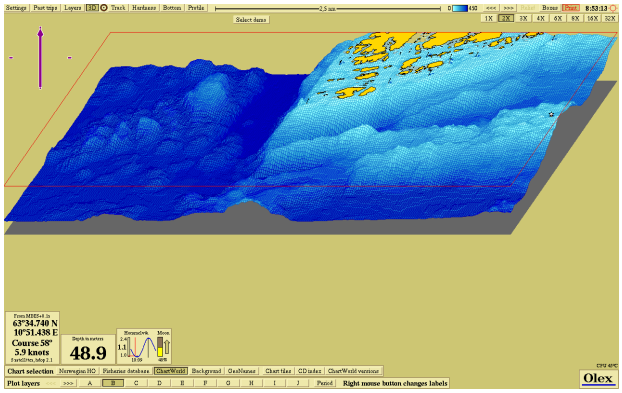
image, while the left screen shows the main Olex screen.



Choose one of the "Dual Display" resolutions at the start.

Isometric 3D view

This is the original 3D version Olex had when the machine was launched in 1998. To view Isometric 3D, first disable Layers → New perspective 3D, if not open the new 3D feature instead.
Click on 3D in the main menu. Isometric 3D shows the same map displayed in 3D as in 2D. All functional panel found in 2D is also displayed in this 3D view. Zooming, moving map, location of way points and other features can be performed in the same way as in 2D, except for bottom zoom and display of depth contours.



Change the topography by clicking the X-buttons in the right corner.

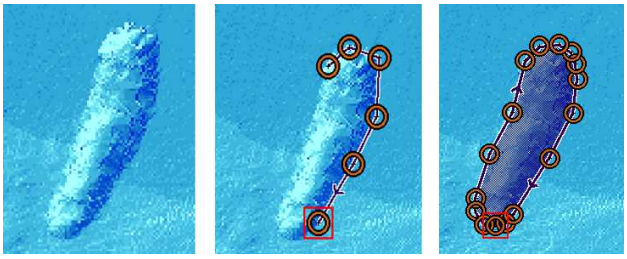
Save own depth data

All self-measured seafloor data can be stored in a file. Open the filebrowser by Settings → Save data to storage device, or connect a USB device. Click on Own depth data and then click Save.

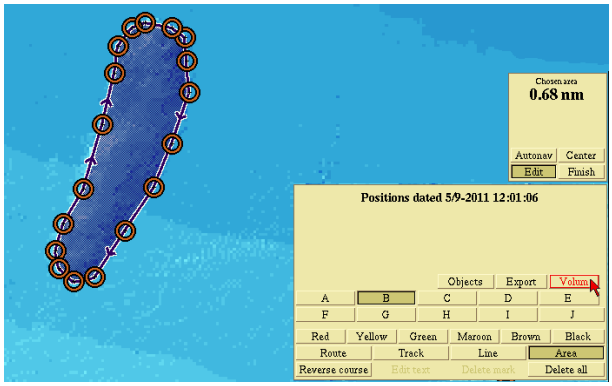
Area and volume calculations

In areas with seafloor maps, Olex can calculate the volume of water- and seafloor mass within a limited area.
Start by creating an area, then set the upper and lower limits for the volume to be calculated.
If some of the area is going to cover landareas only "wet" area twill be calculated.

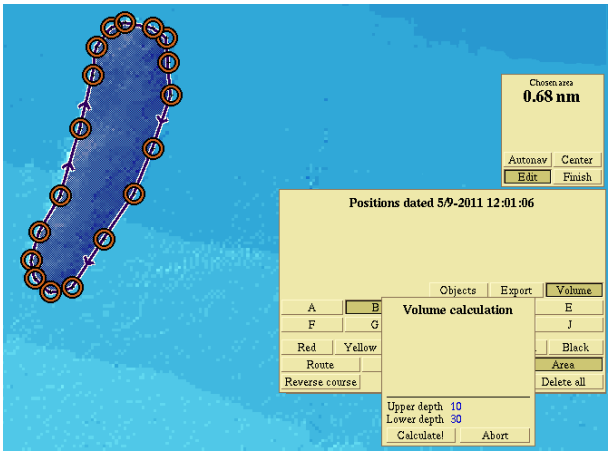
Start by creating an area.



Then click Volume.

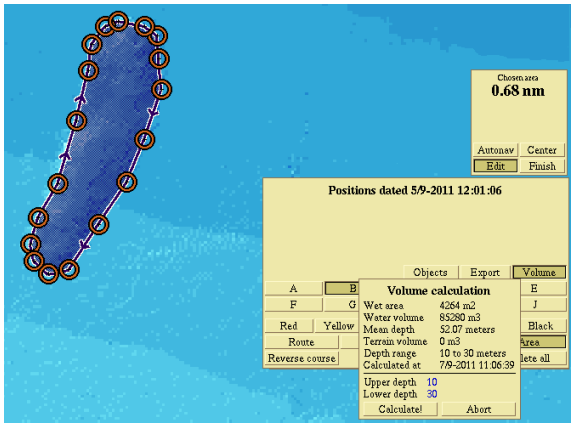


Set the upper and lower depth values, by clicking on the numbers and then change the depth values.



Enter the new value and click Ok.

IIf the numbers are numbers stand unchanged, ie, 0 as the upper value and 9999 as lower depth, only the water volume will be calculated.
Terrain volume is calculated only if the lower value is no deeper than 100 meters below the deepest seabed in the area.

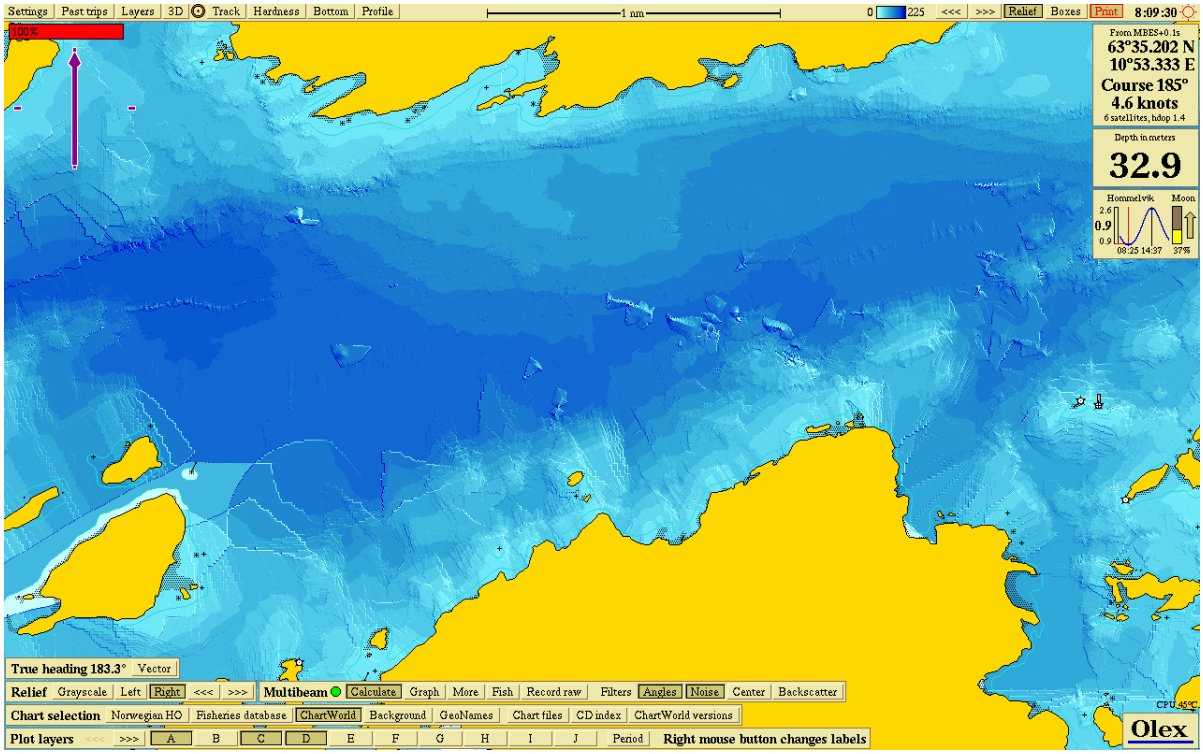


The following values are calculated:

- Wet area - projected area of seabed within the selected area.
- Water volume - volume of water within the given area, bounded by the upper and lower depth limit.
- Mean Depth - The average depth in the area.
- Terrain Volume - Volume of terrain mass between the upper and lower depth.

The accuracy of volume calculation depends on the resolution of the seafloor map. To calculate a small area accurately, the seafloor map must have a higher resolution than usual.

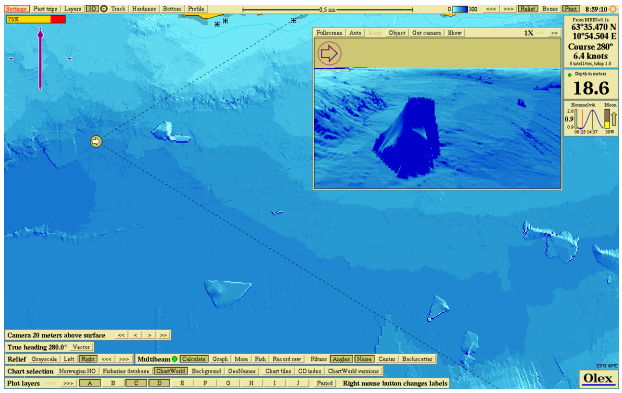
Remove depth errors



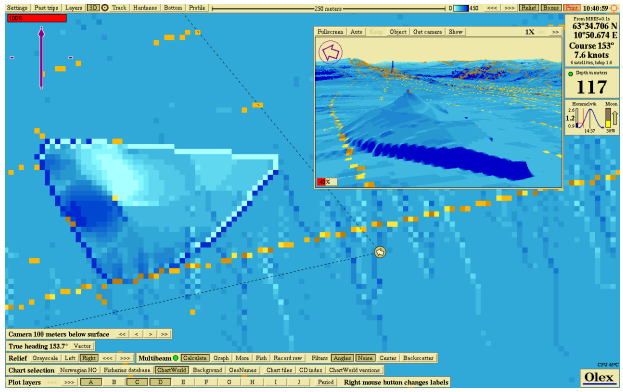
Depth values that creates unwanted and abnormal formations in the seafloor map, are usually considered as depth errors. These may appear as peaks or holes in the bottom map, or longitudinal edges or scars. Depth errors can occur for various reasons. The most common reason incorrect sonar, settings, noise or variations in the sound velocity which is caused by the temperature and salinity. By studying the seafloor maps using relief, 3-D view, and bottom zoom, it is easy to locate depth errors and delete them. When one or more depth errors is deleted, the machine will start the recalculation of the seafloor map. Note that this may take some time depending on the complexity of the seafloor map.

Removing single depth errors

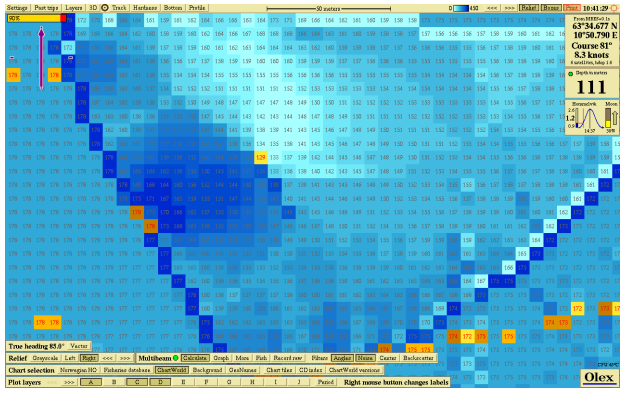
This method is best suited for removing one or more single depth errors.



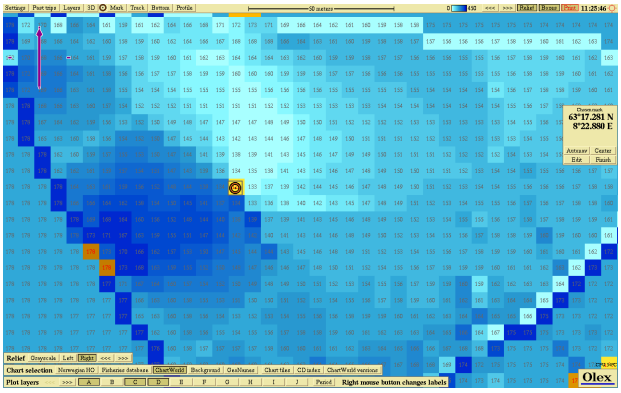
1. First, select Boxes to see the vertical soundings.



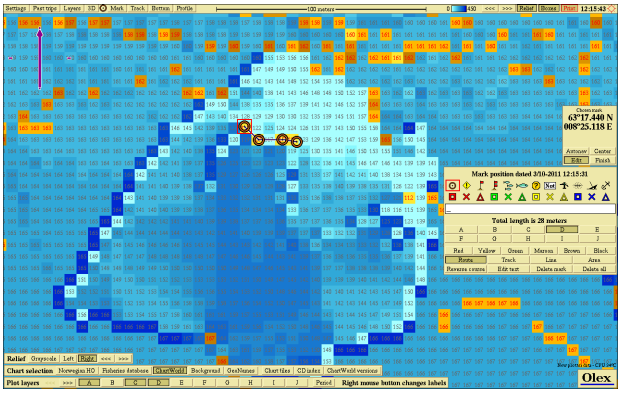
2. Zoom in, until the depth values are shown.



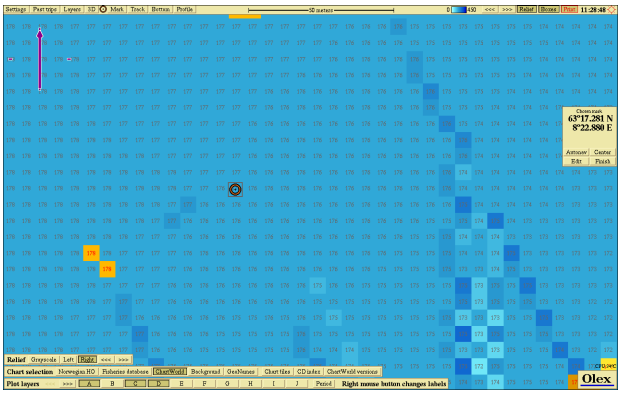
3. Find the possible depth error, and place a mark in the depth box.



4. When there are several depth values to be removed, place a mark at each depth box so it formes a line object.



5. Choose Settings → Delete selected measurements. Answer Yes when asked “Erase depths indicated by active object? “ The selected depth value(s) are deleted, and the seafloor map is recalculated.

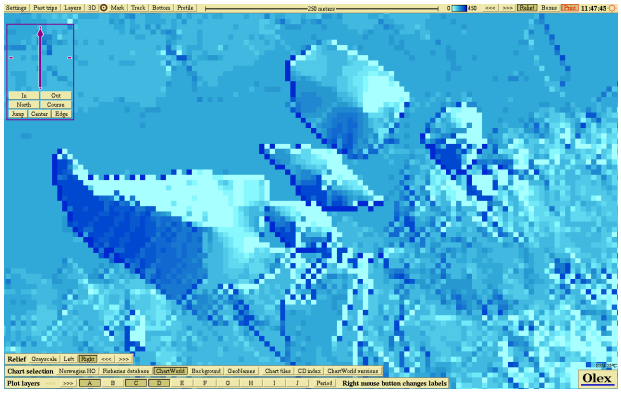


6. The mark / line object can be removed when the recalculation is finshed.

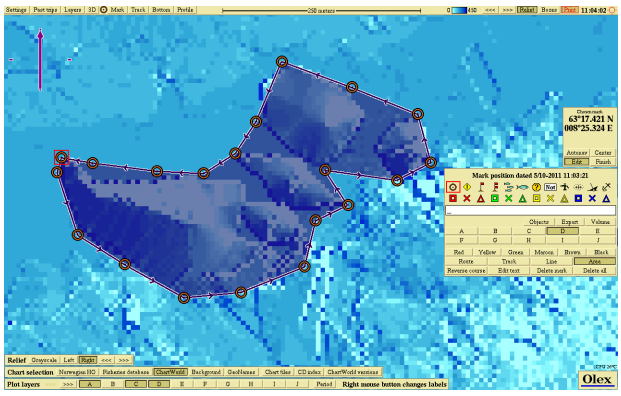
Removing depth errors using bottom zoom

This method is suitable for removing larger areas of depth errors. The depth values are first delimited by an area, and the bottom zoom function is used to separate and delete depths that differs from the terrain around.

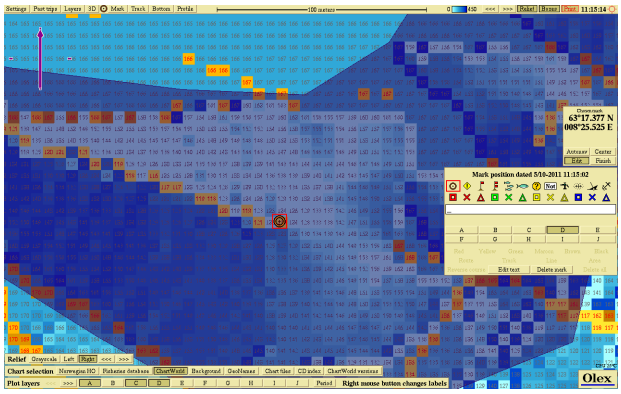
1. Zoom in, until the depth errors are displayed in detail.



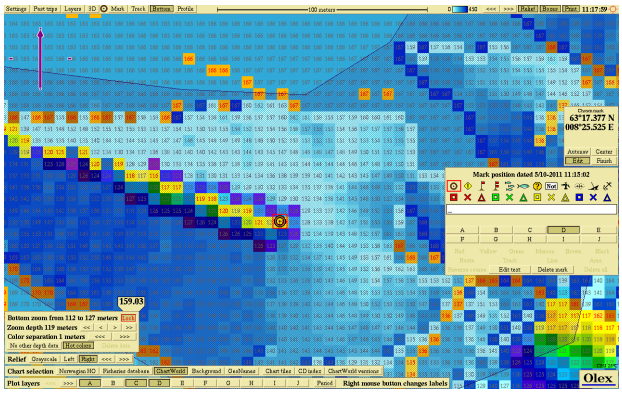
2. Create an area that delimits the depth errors.



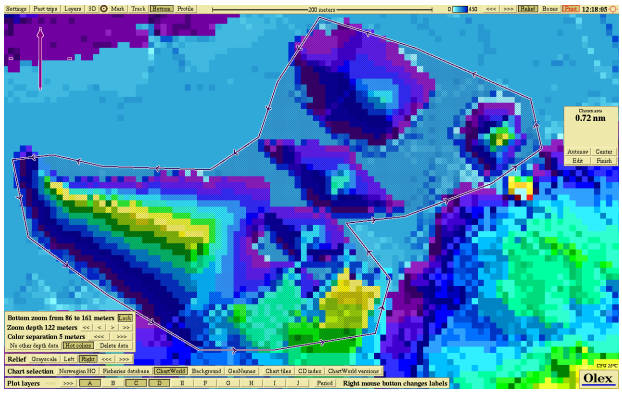
3. Choose Boxes in the main menu, to see the vertical soundings. Zoom in, until the depth values are displayed.



4. Place a mark in a depth box with a depth error, and then click Bottom to start the bottom zoom function.



5. Select Keep in the bottom zoom panel. Then remove the mark, this is only used to define the bottom zoom depth. Adjust the color separation to determine the bottom zoom range, so that most errors are included.

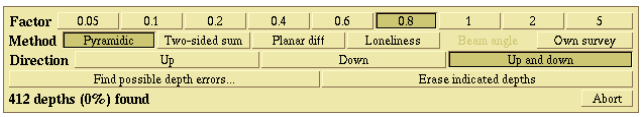


6. Than select Delete data in the bottom zoom panel, to delete the depth errors.

Search for errors

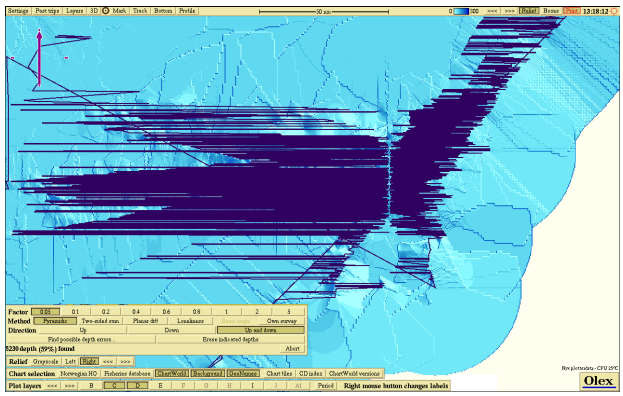
The system can also search for errors on the basis of given search parameters. There are several ways to search for depth errors, depending on the terrain and type of depth errors. It may therefore be necessary to try out different settings to find the depth errors.

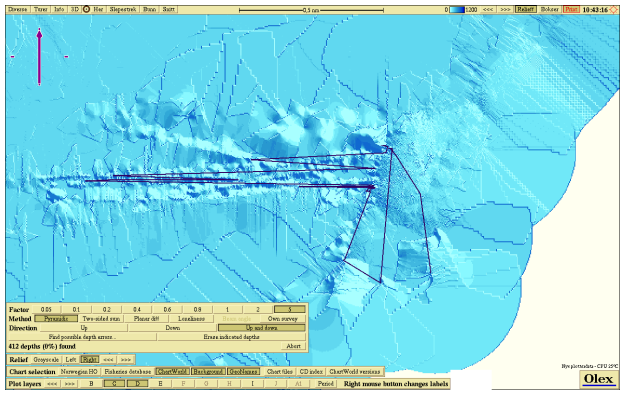
Click Settings → Search for suspicious depth data, to open the panel for setting the search parameters.



Factor

Coefficient which is set to determine how critical the machine should be in the search for depth errors. Low numbers gives an uncritical selection and a lot of depth values are include. While the higher the number, the more critical the selection of the depth errors. The pictures shows search for pyramidal depth errors with a coefficient of 0.05, respectively, on the top picture and 5 on the bottom picture. .





It is most convenient to start by selecting “1” and then try larger and smaller values, to see which measurement errors are included.

Method

There are several ways tosearch for errors, depending on the terrain in the area.

Pyramidic - Searching for pyramic peaks or holes in the seafloor map.

Two-sided sum - Searching for depth errors in the slopes, either up or down.

Planar diff - Searching depth errors that differs from the mean around a depth value.

Loneliness - Searching for depth values that are far away from the other measured depth values, so it is difficult to say whether the value is real or not.

Beam Angle - Applies only multi-beam echo sonders, searching for depth errors caused by the sonar beam angle.

Own survey -This means that depth values from the database "Olex standard" near own measured depth values, are deleted and the seafloor map calculated only on the basis of own depth values.

Direction

When Search for suspicious depth data is used, the machine compares series with depth values to find possible depth errors.

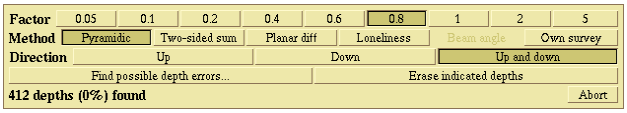
Up - compares and searches for depth errors in the range from the current value and upwards to a shallower value.

Only down - compares and searches for depth errors in the range from the current value and upwards to a deeper value.

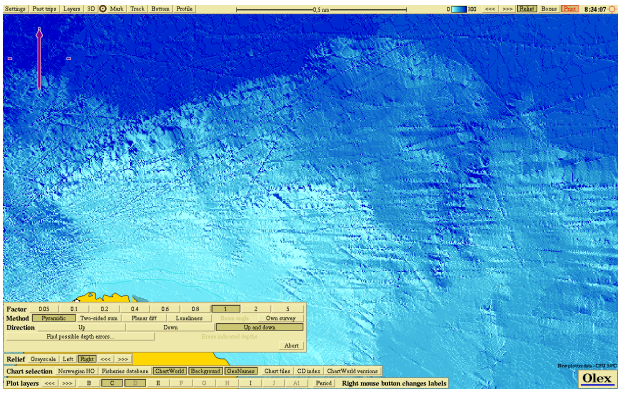
Up and down - searching for depth values in both directions simultaneously.

Auto search for errors

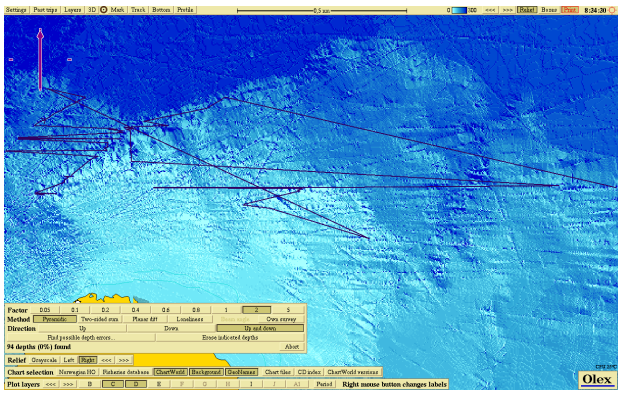
The machine can search for depth errors automatically. Choose Settings → Search for suspicious depth values. Various parameters can be set to search for depth values in the visible screen.



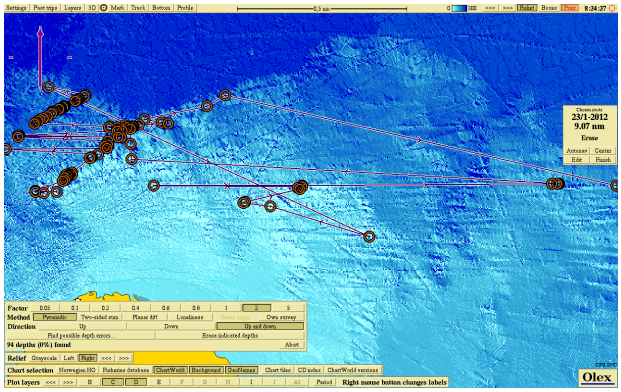
1. Zoom in, until the screen displays the area where to search for depth errors.



2. Choose factor and method, and then click Find possible depth errors... The possible depth errors are shown as waypoints that forms a line object.



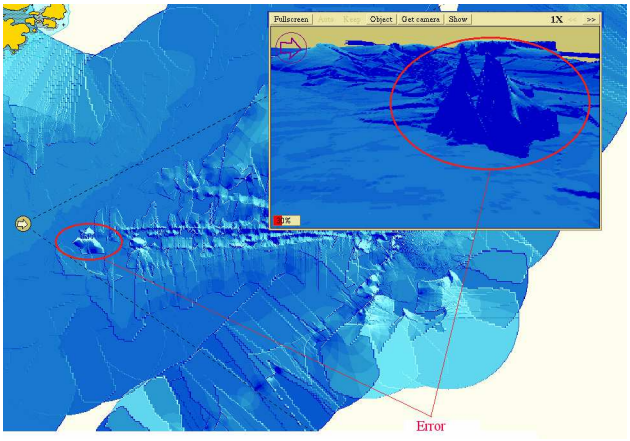
3. By opening the line object for editing, the waypoints can be moved around to choose what depth values to delete.



4. Then click Erase indicated depths. And confirm when asked " Erase these indicated depths?". Repeat the prosess again, or click Abort to exit.

Delete depth errors along a trip

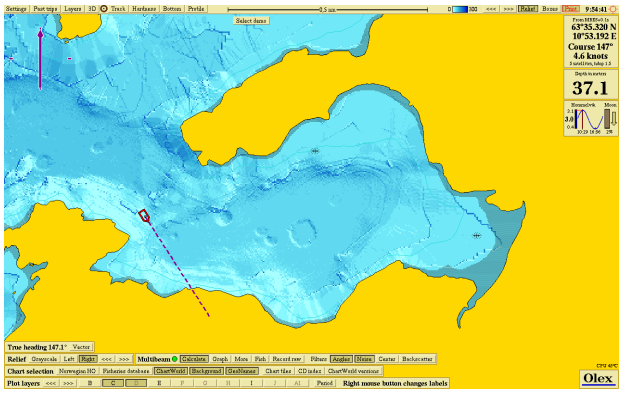
Sometimes a lot of depth errors may occur on a particular trip. This turns out like a track or bump along the seabed, and it may be desirable to delete all the measurements on this trip.



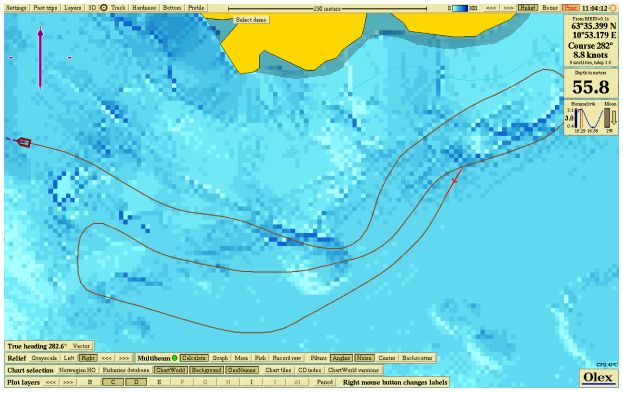
Delete all depth values along this trip

If it turns out that poor raw data are registered during the survey, the seafloor calculation can be turned off and the data deleted.

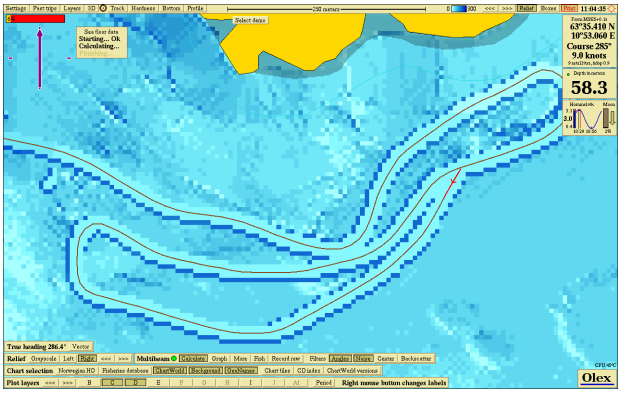
1. First switch off the seafloor calculation by choosing Settings → Seafloor calculation = Stopped.



2. Choose Past trips → Current trips → Show trip on map.

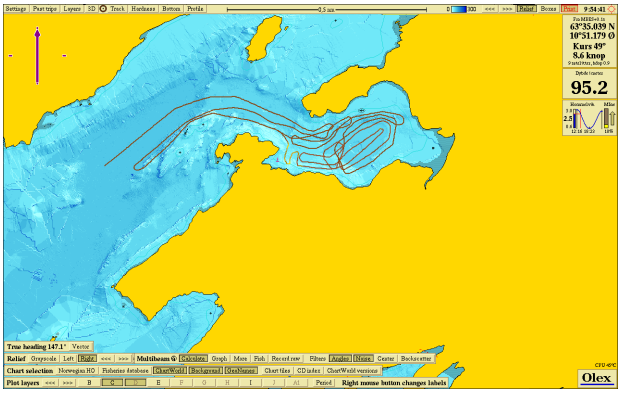


3. Then choose Past trips → Delete measurements along the trip. All measured depth values along the trip will be deleted, and the seafloor map is recalculated.

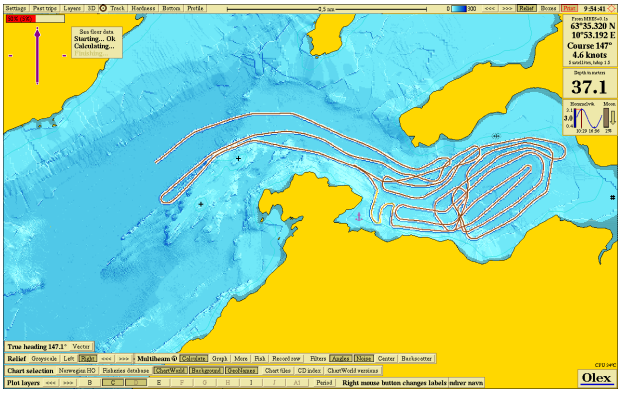


Delete all depth values along a previous trip

1. Find the trip by opening the **Past trips menu**, and browse through the saved trips.



2. Choose Past trips → Rescale according to this trip → Delete measurements along the trip.



3. All self-measured depth values along the trip will be deleted, and the seafloor map is being recalculated.

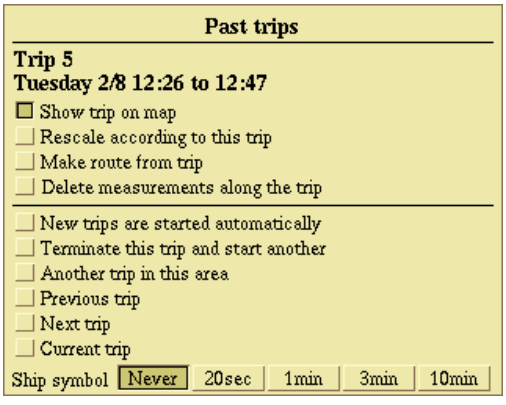
Trips

All trips are registered and stored automatically, and can be displayed from the Trips menu. The trips are numbered chronologically, and have a date and a timestamp.

Trips data can not be deleted or changed, and can not be exported to other Olexsystemes.

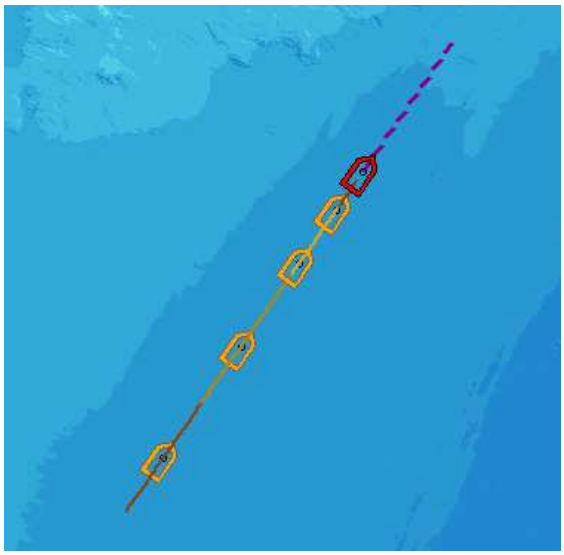
A trip appears as a reddish-brown line that is logged in the vessles wake. The color of the line indicates the ship's speed; light color indicates low speed, dark color indicates a higher speed.

Click on Trips in the **Main menu** to open the **Trips panel**. The header displays the trip number, date and time. Trips that are registered today, displays the time only.



- Show trip on the map - this is the same trip that is displayed in the heading.
- Rescale according to this trip - Scales the map so the entire trip is displayed on the screen.
- Make route from trip - A copy of the requested trip is created, and saved as a new route. The trip will be found in the log and can be displayes as usual.
- Delete measurements along the trip - Deletes all depth measurements along the trip.
- New trips are started automatically - the function start and end trips automatically. A trip is considered completed when the ship has lain at rest over a certain time. A new trip is started automatically when the ship starts moving again.
- Terminate this trip and start another - ends the current trip and start a new trip immediately. The feature can be used even if the function "*New trips start automatically*" is turned on.
- Another trip in this area - browse the saved trips recorded in the area of the screen. Press the button repeatedly to see all tours in the area.
- Previous trip and Next trip - scrolls back and forth. Then select View trip on the map and Scale the map so the whole trip is to see the trip on the screen.
- Current trip - Displays the last trip.

Ship symbol displays the ship's position and heading along the trip. Select the time interval by clicking on one of the buttons to the right.



MBES - MultiBean Echo Sounder

SOFTWARE: MBES + HT key
HARDWARE: multibeam sonar (Kongsberg EM Series)
INTERFACE: Ethernet

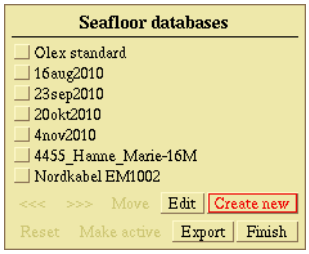
Multibeam echo sounders are primarily used for surveying and seafloor mapping, providing a significantly better accuracy than conventional single beam echo sounders.

MBES - Multi Beam Echo Sounder software, is designed for use for echo sounders of Kongsberg EM Series.

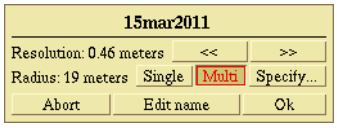
All sensors are connected to the echo sounder. Settings and configuration are made on the echo sounder, that produces raw data and sends these to Olex using ethernet.

Usin the incoming GPS position and depth data, Olex starts calculating the seafloor map.
Measured and calculated data are stored ontinuously in a depth database.

To create a new database, click Create New.



Click Multi for multi beam echo sounder.



The resolution is set by using the arrow keys.
Radius specify the radius of the area thar are calculated around each sounding, and is directly dependent on the resolution.
The resolution must be set to an appropriate value, so there wil be no gaps in the seafloor map.

In shallow water, use a finer resolution and high ping rate.
While in deeper water use a coarser resolution and low ping rate.

A rule of thumb is:

Resolution = expected depth / 200

See“Databases” on page 37.

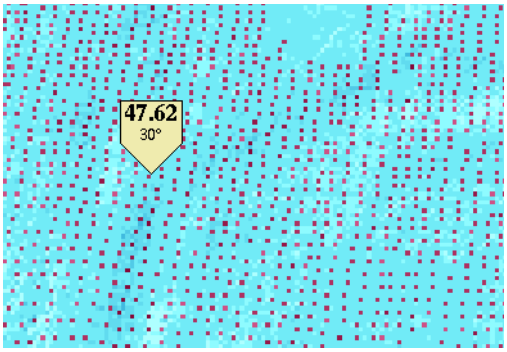
Olex machines with MBES have a toolbar in the lower left side of the screen, with options for turning on and off base calculation and noise filtering.

All configuration and settings are made directly on sonar, that sends data to Olex.

Incoming raw data can be filtered to avoid obvious errors in bottom map.

Calculate - turn on and off the sea floor calculation.

Angle - the system saves the best vertical data in case of overlapping measurements.
Zoom in and move the cursor over the depth boxes and the beam angle of the soundings is displsyed in the depth box.



Noise - removes the obvious vertical errors during the survey - values that provides holes and peaks in the map.

Center - deletes depth values in the center of the echo.

Backscatter - turns of backscatter - measurement of bottom hardness, and saves only the depth values.
This function uses less machine capacity, if bottom hardness is not necessary.

WASSP

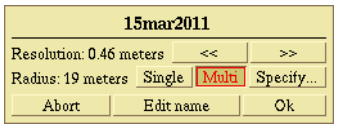
SOFTWARE: WASSP nokkel + HT-nokkel
HARDWARE: multibeam sonar
INTERFACE: Ethernet

WASSP is a multi beam echo sounder that uses wide-angle sonar to map the water column and seabed. The echo sounder has 112 beams, covering a sector of 120 degrees.

In combination with Olex, WASSP makes a fast seabed mapping with a significantly better accuracy than conventional single beamecho sounders. All sensors are connected directly to the WASSP echo sounder, that produces raw data and transmits these to Olex via ethernet. Measured and calculated seafloor data are continuously stored in a depth database.

To create a new database, click Create New.

Click Multi for multi-beam echo sounder.



The resolution is set by using the arrow keys.
Radius specify the radius of the area thar are calculated around each sounding, and is directly dependent on the resolution. The resolution must be set to an appropriate value, so there wil be no gaps in the seafloor map.
In shallow water, use a finer resolution and high ping rate. While in deeper water use a coarser resolution and low ping rate.

A rule of thumb is:

Resolution = expected depth / 200

See ‘Databases” on page 37.

Using WASSP

Normally there si no operation of the WASSP machine. All configuration and settings are made directly on the echo sounder, that transfers the raw data to Olex.

The button row in the lower left corner shows the available functions, that are used for filtering and viewing the raw data.

The indicator on the left shows the status of the survey.

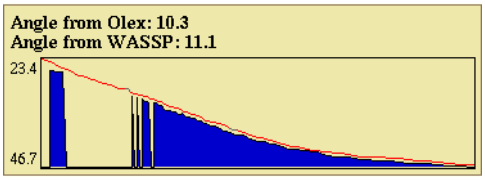
- no errors in the seafloor mapping

- error, the calculation is stopped

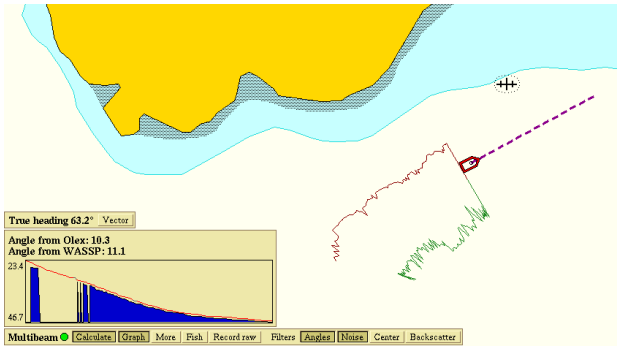
- no connection

Calculate - turns on and off the sea floor calculation.

Graph - Shows a profile of the cross section where the caltulation is done at the moment. The diagonal shows the angle in the cross section from the left to right side, and the calculated angle both from Olex and WASSP.

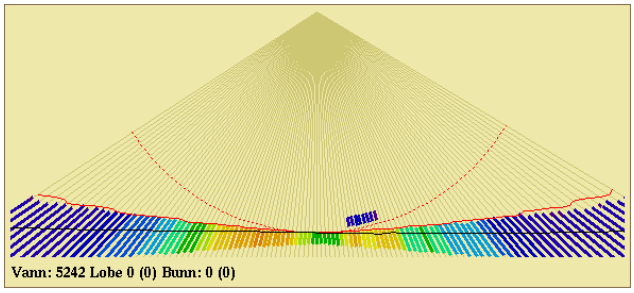


And on the map, displayed at the same time, port and starboard flank.



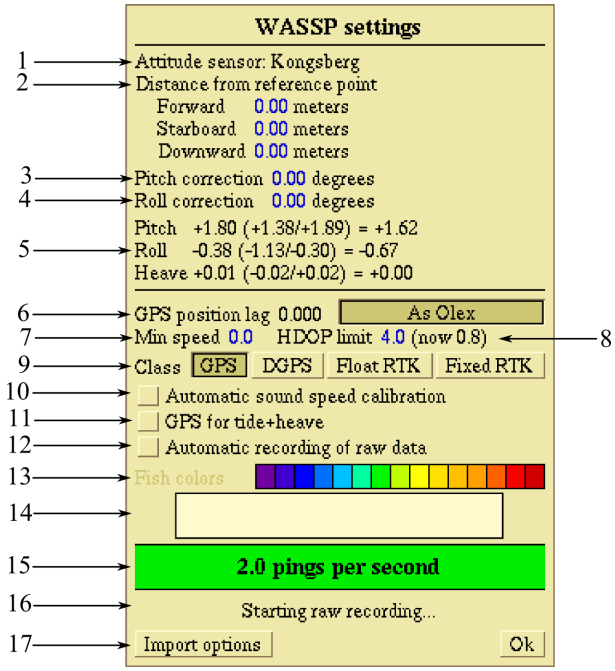
Grey areas on the graph are peaks that are filtered out due to obvious errors.
Blue areas beneath the graph are parts of the seabed already mapped.
This window is used mostly as a tool for troubleshooting, and have no practiacl impact on the seafloor mapping.

If the Fish - button is activated, a sonar image opens where objects in the water column are shown in colors.



Black lines show the seabed detection from WASSP, and the red lines show the detection of various calculated bottom echoes.

More - opens a panel with settings for configuration of WASSP.



1. Displays the type of motion sensor. If several sensors are available, Olex will prioritize the best sensor, i.e. the one that provides the best accuracy.

2. The motion sensor must be placed near a selected reference point, close to the ship's center where there will be a minimum of vertical movement. The reference point that is chosen must be the same as in the WASSP setup. If the sensor is placed at some distance from the reference point, correction for the different values, forward, backward and downwards, can be added.

   Click on the blue numbers to open the panel where to enter the correction.

3. pitch correction in degrees.

4. roll correction in degrees.

5. Displays the current values of Roll, Pitch and Heave.

present value (min / max) = mean values for the last 1 / 2 minutes

6. GPS lag - all GPS systems have a small delay. GPS lag in seconds can be entered directly, or by choosing As Olex . Then the value for the GPS lag will be provided by the Olex software.

7. Min speed - minimum speed that must be achieved for the seabed mapping to take place.

8. HDOP limit - Horizontal Dilution of Positioning - is a number for the quality of the satellite reception. And a requirement for the minimum quality of the position, for the calculation to take place. The number in brackets shows the HDOP value at the moment. If this value is too high, the seafloor mapping stops.

9. GPS - class, different types of GPS receivers have different accuracy.

   GPS - uses satellites to determine the position. Accuracy up to 50 meters. If GPS is selected, all depths are recorded regardless of position accuracy.

   DGPS - Differential GPS, the expansion of the GPS system.
   Uses a network of land-based reference stations to broadcast the difference between the positions specified by
   satellite system and the actual position of the stations. (Accuracy up to + / - 5 -10 meters)

   Float RTK - (accuracy up to + / - 0.2 to 1 meter)

   Fixed RTK - (accuracy up to + / - 1 - 5 cm)

10. Automatic sound speed calibration - by enabling this feature, constant sound speed calculated from Olex is used instead of the fixed sound speed that is added in the WASSP setup.

11. GPS for tide + heave - For the GPS system to be able to calculate an accurate position on the earth, there must be a framework to describe the coordinates and references. The earth does not have a uniform gravity and there are different models for the calculation.

Ellipsoid - is the simplest of the models, an ideal model of an elipsoide based on reference points on the earth.

Geoid - is a model based on the earth's density and gravity. This corresponds roughly with the sea surface level.

DNSC08 - is the most accurate model.
Based on satellite measurements in the oceans over the past 12 years.

12. Automatic logging of raw data - turns on and off the logging of raw data.
Logging starts automatically when the ship is set in motion.

13. Fish Colors - by enabling the fish to this option is used. The colors indicate the strength of the echoes in water column. The colors may be masked by clicking on them so that there is possible to distinguish the echoes to be displayed.

14. When the cursor is moved into this window, some text may be displayed. These parameters are used for debugging and has no practical meaning.

15. The green bar shows how many pings the transducer receives per. second.

16. View the status of the raw logging.

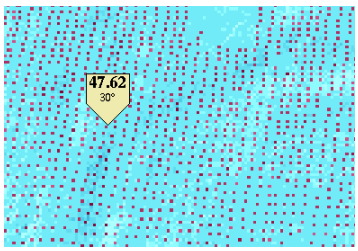
17. Import options - previously recorded raw data files can imported into the system again.
If errors are detected in the instruments settings, different import flags can be set to corrects the raw data file.

Form - option = value

Option	Unit	Description
pitchkorr	degrees	correct for pitch errors - sensors' mutual location.
rollkorr	degrees	corrects for roll errors - sensors' mutual location.
headingkorr	degrees	corrects the heading error
gps_x	meter	corrects for distance from reference point to GPS
gps_y	meter	corrects for distance from reference point to GPS
gps_z	meter	corrects for distance from reference point to GPS
transducer_x	meter	corrects for distance from reference point to trasducer
transducer_y	meter	corrects for distance from reference point to trasducer
transducer_z	meter	corrects for distance from reference point to trasducer
atti_x	meter	corrects for attitude in xretning
atti_y	meter	corrects for attitude steeped in research
atti_z	meter	corrects for attitude in z-retning
gpshoyde	meter	corrects for GPS height
gpslag	seconds	corrects GPSforsinkelse

Calculate - turn on and off the sea floor calculation.

Angle - the system saves the best vertical data in case of overlapping measurements.
Zoom in and move the cursor over the depth boxes and the beam angle of the soundings is displsyed in the depth box.



Noise - removes the obvious vertical errors during the survey - values that provides holes and peaks in the map.

Center - deletes depth values in the center of the echo.

Backscatter - turns of backscatter - measurement of bottom hardness, and saves only the depth values.This function uses less machine capacity, if bottom hardness is not necessary.

Seafloor hardness - ES60

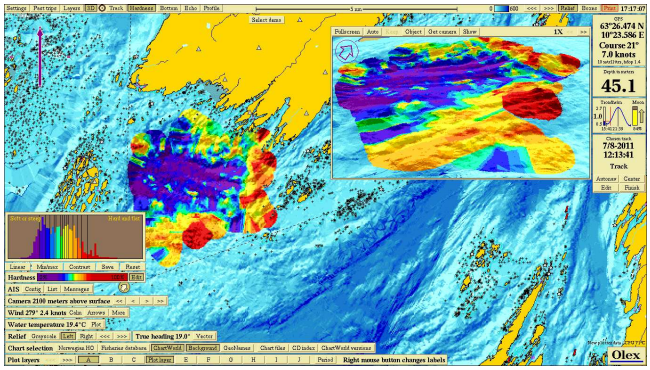
SOFTWARE: HT - nokkel
HARDWARE: Sonar with BI500 interface (ES60/ES70)
INTERFACE: Ethernet

The HT-software can be used by echo sounders with BI500 interface, like Simrad the ES60 - and ES70 family.

Raw data from the sonar are sent to Olex, and the system can calculate the seabed topography and hardness.
The calculation is done based on the seabed's ability to reflect sound signals, adjusted for factors that can affect the measurements.

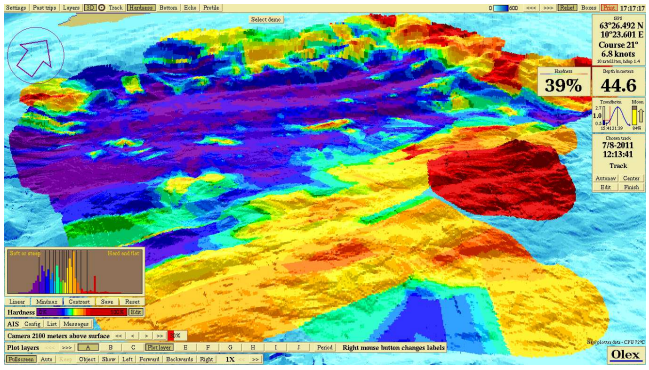
Without the HT-software, data from the Simrad echo sounder will be treated as data from a common echo sounder, where only the depth values are transferred via serial cable.

The hardness is displayed in colors, each color representing a hardness value. Click Hardness in the main manu to turn on the view.



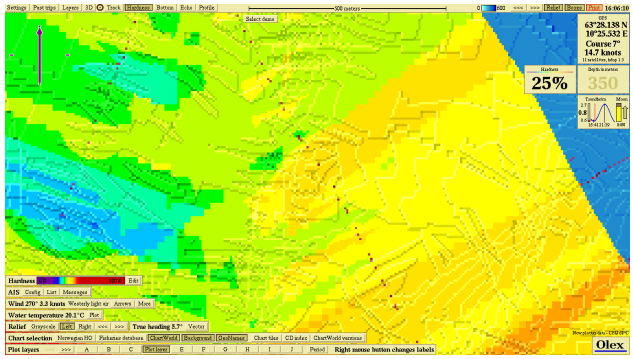
The hardness is specified in percentage, where 0% is soft and 100% maximum hard.

The hardness of the the last sounding is displayed in a separate panel to the right. The hardness value is also shown in the depth flag that appears when the mouse cursor is moved around.



Because of quality requirements and calculation methods, there can be areas without hardness values. In these areas only the depth values are displayed.

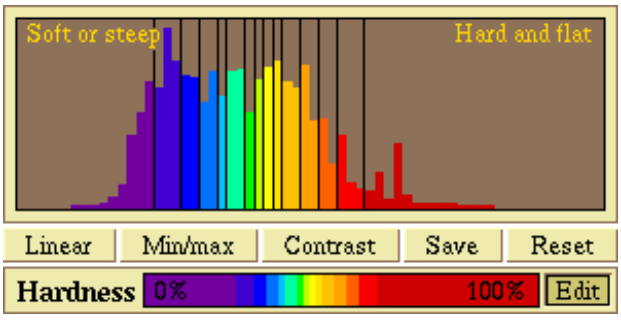
Turn on Boxes, to view only the vertical shoots that are basis for the hardness calculation.



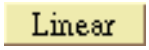
Adjusting the hardness colors

The panel at the lower left shows the hardness colors spread on a scale from 0% to 100%.

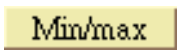
Click Edit to open a view of the of hardness colors used in the visible screen.



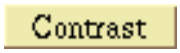
The buttons at the bottom of the window are used to change the color spread.



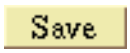
The colors are spread linearly from 0% to 100%. Each color will always have the same hardness.



The colors are spread evenly from the lowest to the highest value.

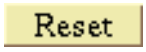


If an area has little variation in hardness values, the columns may have almost the same color.
Contrast spreads all hardness colors, so there will be higher contrast between the different values.



Current color setting is stored as a color profile.

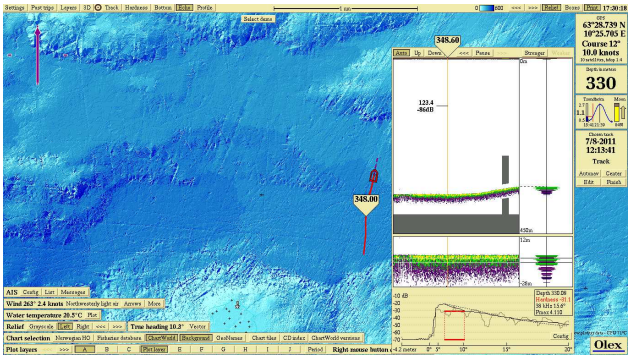
Loads a previously stored color profile.



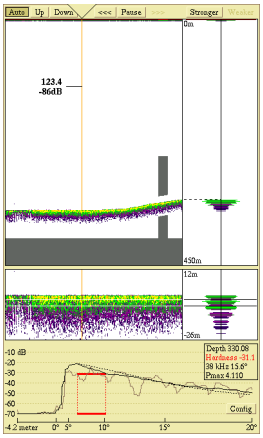
Changing the color settings, do not change the hardness values stored in the system. The colors can be adjusted, but the colors mutual location can not be changed.

Echogram

To open the traditional view of the sonar window, click on Echo in the main menu.



The echogram opens to the right, and a red line is displayed on the screen that shows the echograms extent.



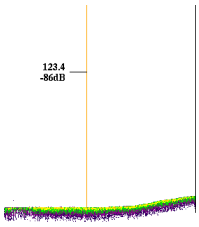
The echogram consists of 3 parts.
The left part displays the water column, the right part displays a detailed view of the last sounding.
The bottom echogram shows a detailed picture of the echo, without depth values.

Depth scale

The depth scale is determined by settings in the echo sounder.

When the cursor is moved into the echogram ,a line appears. A flag displays the depth in that point. The corresponding depth flag is also displayed on the map.

The cursor can be moved up or down to show the depth in the water column, and the attenuation of the echo.



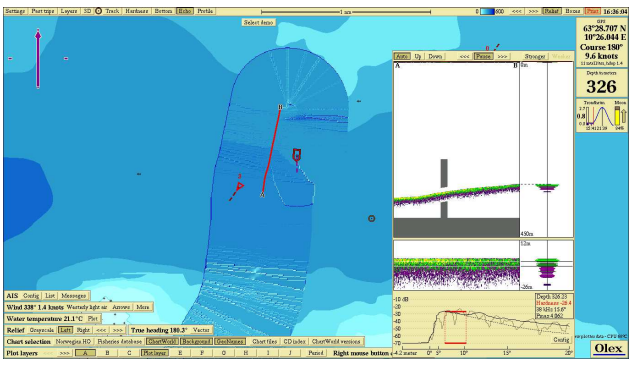
The buttons Auto, Up and Down moves the echogram in the water column.

- Auto scales the echogram automatically.
- Up or Down moves the echogram manually.

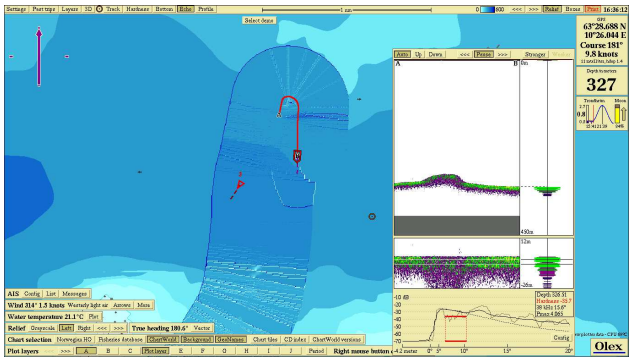
History

The arrows at the top of the echogram window can be used to scroll back and forth in historical echogram data.

Pause freezes the echogram. The end points are named with the letters A and B, the echogram thus displays the section from A to B on the map.



The arrows <<< and >>> moves the echogram each time you click on one of the buttons, the track moves accordingly.



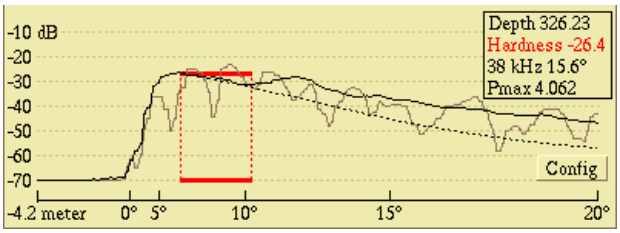
Move the mouse cursor inside the window, press and hold the schrollwheel to to move the echogram. Or press both buttons on a two-button mouse.
When Pause is disabled, the echogram returns to its normal mode again.

Adjusting the signal strength

The buttons Stronger and Weaker changes the signal strength of the echo, Stronger amplifies the echo so details becomes more perceptible on the graph. The disadvantage is that the noise is amplified as well.Weaker reduces the amplification of the echo.

Details of hardness calculation

The graph shows details of the hardness calculation.



The light gray curve shows the spread of the last sounding.

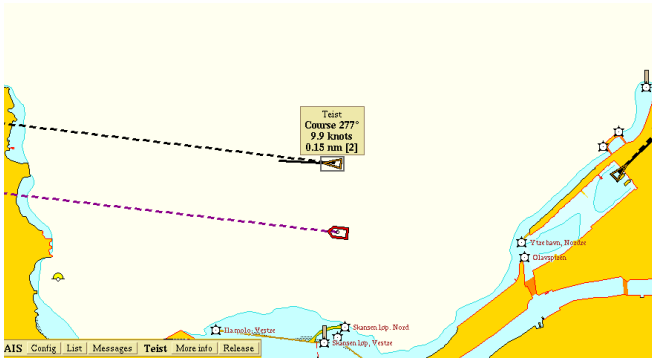
The dark gray curve shows the average of the last 100 soundings and the dashed line shows a theoretical average of the spread of sound.

The red frame shows the area for the hardness calculation.

AIS

SOFTWARE: AIS-nokkel
HARDWARE: AIS-transponder
INTERFACE: serial port

AIS is introduced for safe navigation, and to improve water-borne traffic monitoring. AIS identifies heading and speed of other ships, and its main function is to prevent collision between vessels. Ship information is broadcast over the VHF band, and it will even receive same type of information from other ships and base stations. Clicking on an AIS target will open an information box, that displays the vessels name, heading, speed and distance from own ship. The number in brackets shows the time elapsed since the last message from the target was received.



AIS symbols:

Ship symbol, the arrow indicates which way the vessel is about to turn.

«Sleaping», the vessel has not been moving for some time.

The AIS target is about to disappear out of range.

Active base station.

The Base station is about to disappear out of range.

AIS targets are identified by its name or MMSI-id.

The AIS function panel

Olex systems with AIS, has a function panel in the lower left of the screen. Own ships AIS set-up can be configured here.

The panel has 3 buttons, Config, List and Messages.

- Config - opens a new panel with ship information. The AIS set-up can be configured here.
- List – displays a list of all visible AIS targets within range.
- Messages – broadcasts messages to other AIS targets.

Selecting an AIS target by clicking on it, adds 2 more buttons to the panel, and also the vessels name or MMSI-id.

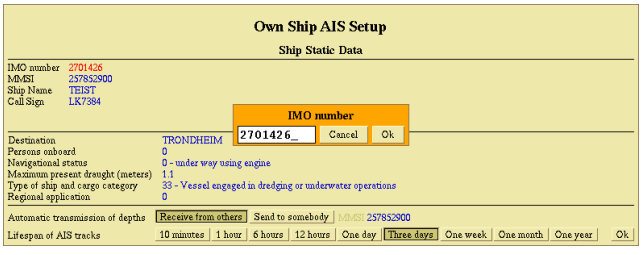
- More info – displays ship information.
- Release – deselects the target.

Configuration

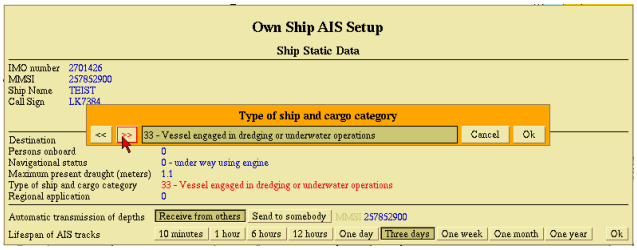
By clicking Config, a panel with own ships AIS set-up opens.

Ship Static Data does not change after they are entered for the first time. This includes IMO number, MMSI-id, name and call sign.

Static Voyage Data changes for each trip, and includes information like; destination, number of persons on board, navigational status and type of ship and cargo cathegory. The information can be replaced by clicking the blue font. A textbox, where to write the new information, opens.



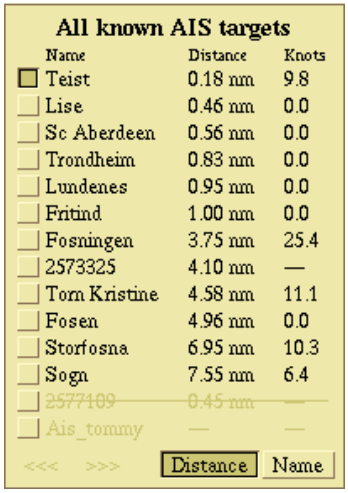
Click Ok to confirm, or click Cancel to abort. Some of the information are standard sentences that can be changed by clikcing one of the arrows until the correct sentence is displayed. Clikk Ok to save the changes.



In the lower part of the panel there are 2 rows of buttons. The buttons in the first row sets preferences for depth transfer betweeen multiple Olex systems. The buttons in the second row determines the lifetime of the AIS track. Click Ok to save the changes and close the panel.

AIS targets

Click List in the AIS panel, and an overview of all visible AIS targets within range opens.



The grey check box indicates that an AIS-target is selected, and that the target's info box is open.

Click on a name to locate the vessel on the screen.

Targets showing the MMSI id instead of the name are AIS targets that:

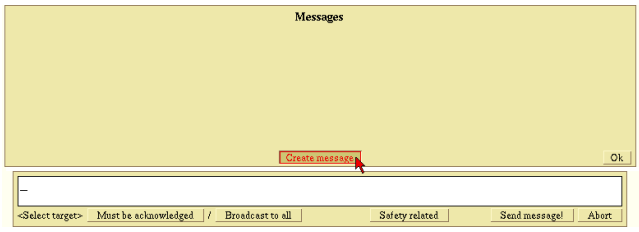
- have just come within range
- class B AIS targets that can not be identified by older AIS transponders

Names or MMSI id's that are crossed-out, are about to disapperar out of range.

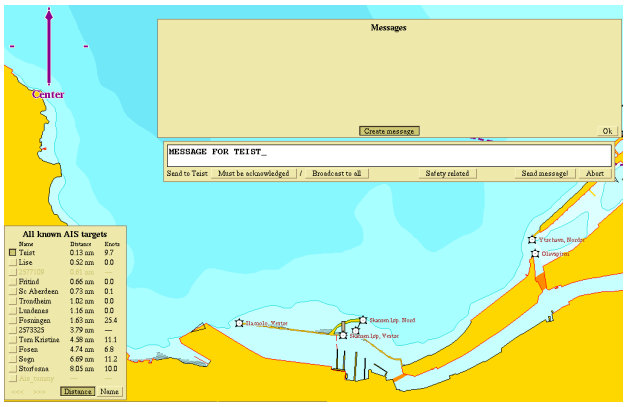
By clicking Distance or Name, the list of AIS targets is sorted either by distance or by name.

Sending and receiving messages

Click on Messages to broadcast text messages to other AIS targets within range. A new panel with the heading “Messages” opens.Click on Create message, and a text box opens under the panel.

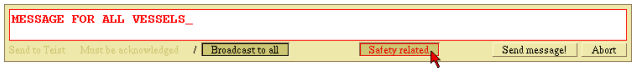


Type the message, and select the vessel from the list of AIS targets. The recipient will appear to the left of the text field as «Send to 'name of vessel'». Click Send message! to send to the selected vessel.



If the recipient has to verify that the message is received, click Must be acknowledged.
To broadcast a message to all AIS targets in range, click first on Broadcast to all, and then click Send Message!.

If the message contains a notification of possible danger, click Safety related. The text turns red, indicating that the message has high priority.



The messages are moved into the upper panel when they are confirmed sent. Status of transfer is shown in brackets in front of the message. When the message is submited, it will disappear from the list.

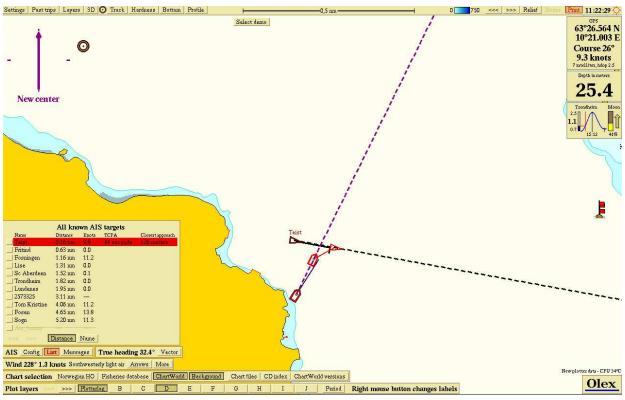
If the transfer fails so that the message can not be sent, the message "** Failed **" appears as the status of the message.

Avoid collision

If two or more vessels may come to cross each other's courses, the system will show the possible future situation given the speed and course that the vessels have at the moment.

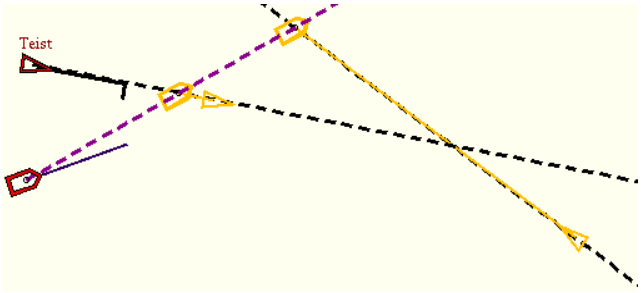
Warning

The ship symbols turn red if there is less than 2 minutes left for the vessels passing each other closer than 1 / 10 miles (185.2m).



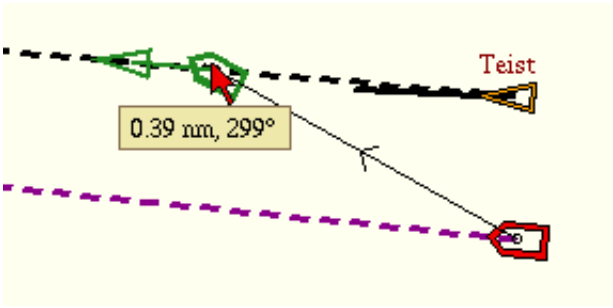
The List button on the AIS menu will flash in red, and when the list of AIS targets is opened, the name of the vessels that are within the area will be marked in red.
In addition, the column **TCPA** (Time to Closest Point of Approach) will display the number of seconds to the closest point of approach occurs, and **Minimum distance** shows the minimum distance between the vessels.

Vessels that may be crossing each other's courses with greater distance, is visualized by yellow ship symbols.

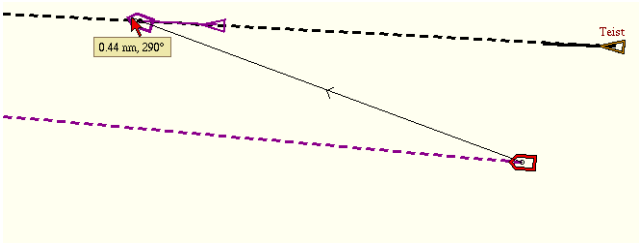


Finding the best course

By turning on Info → Continuous ranging arrow, the cursor can be moved around to try out different courses. The green ships symbols shows that the ship will be passing behind the other vessel.



Purple ship symbols show that the crossing occurs in front of the crossing vessel, but with a good safety margin.



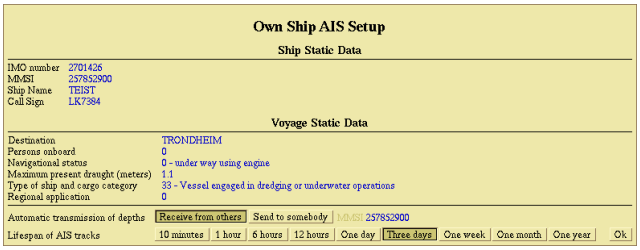
Depth transfer

It is possible to transfer depth values between two Olex systems, so the seabed mapping can be based on measurements from both systems simultaneously. To receive from, or send data to another system, the vessel must be identified with its unique MMSI-id.

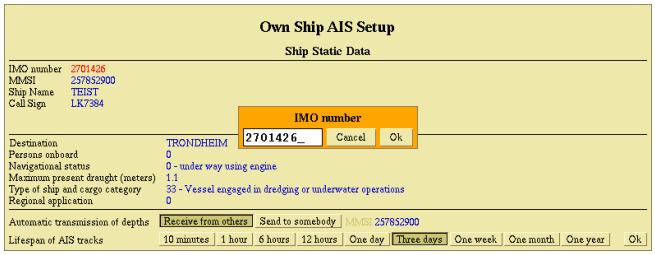
This can be done in two ways:

Entering the MMSI manually

If the vessel's MMSI is known, click on Configuration to open the panel **Own ship AIS setup**. Click on the numbers written with blue font to the right of the text **Automatic depth transfer**.

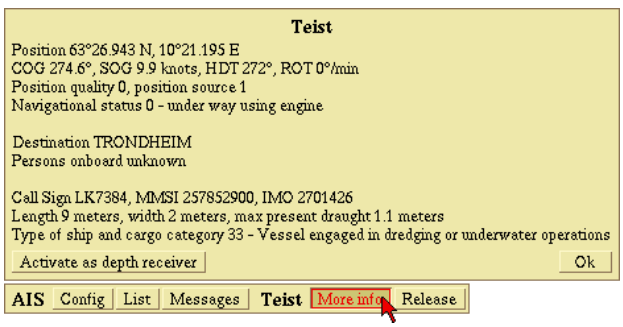


Enter the MMSI-id in the text box that opens, click Ok to confirm. The new value will now be saved in the system.

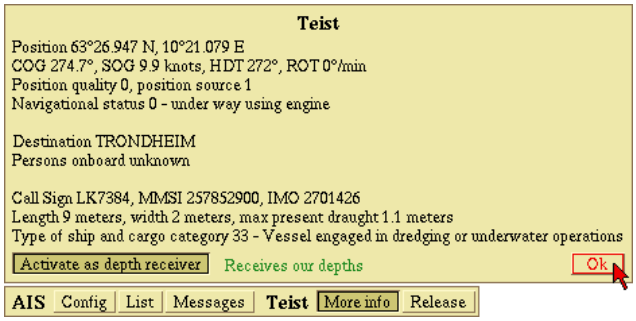


Choose MMSI id from the list of AIS targets

Open the list of visible AIS targets. Then click on the name of the vessel to receive the depth data.

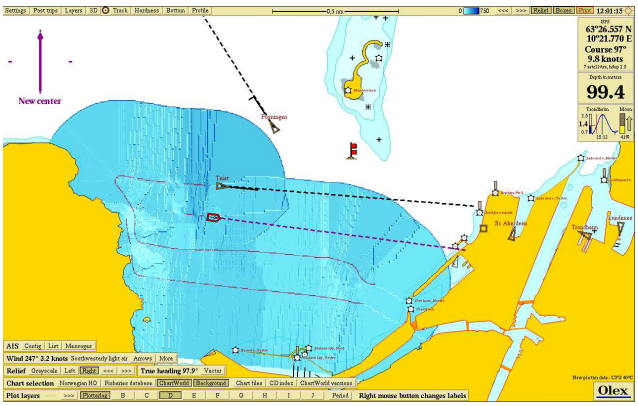


Click More info to open the info panel, and then click Activate as depth receiver.



Click Ok to save and close the panel.

To follow the calculation process, click Settings → Show calculation progress.

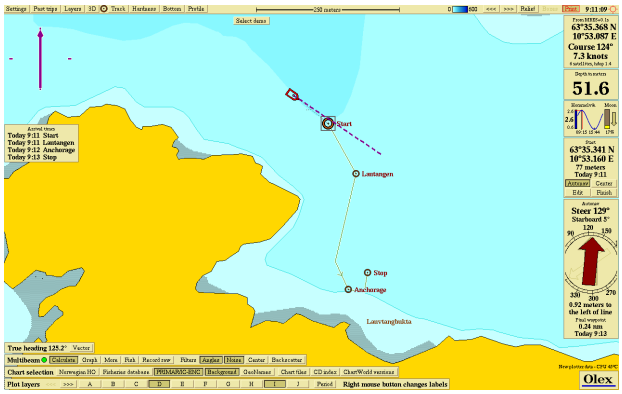


The picture shows the 2 vessels measuring depts, the seafloor map is calcuated continously on the basis of data from both ships.

Auto pilot

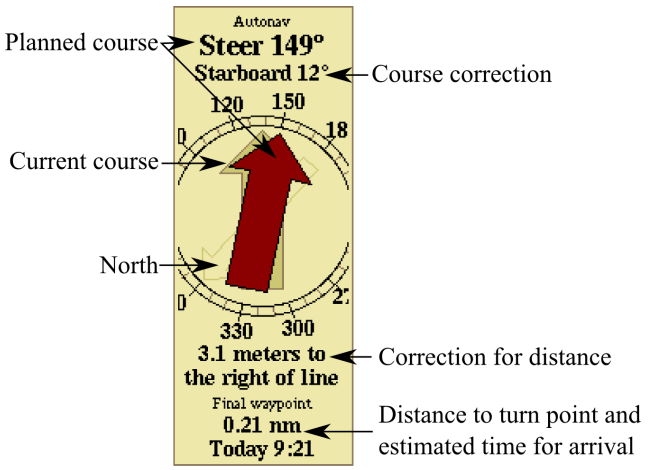
SOFTWARE: Olex normal installation
HARDWARE: Autopilot
INTERFACE: serial port

Vessels with autopilot can automatically navigate against a mark, or along a line object by enabling the Autonav function.



Select the mark or lineobject, and click Autonav in the **Chosen-mark -** or **Chosen-line panel**.

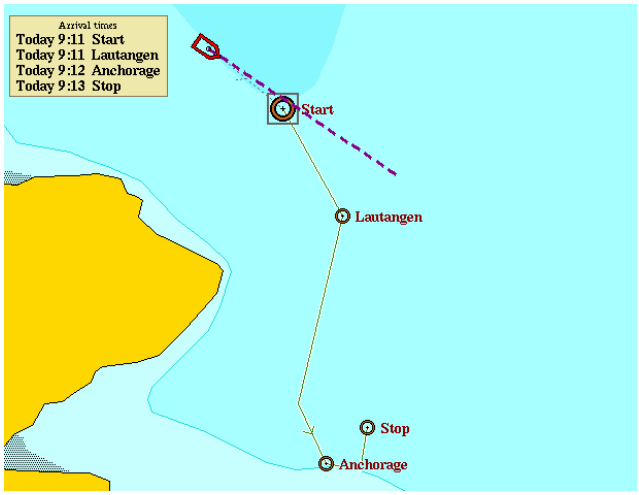
Click Yes to confirm when asked "Do you want to start Autonav?". The autopilot will now receive signals from Olex and starts navigating to, or along the selected object.
The **Autonav-panel** opens to the right. The panel displays a graphical representation of the same messages received by the auto pilot.



The autonav function can also be used without an autopilot installed. Follow the instructions in the **Autonav panel** to steer the ship along the set course.

Estimated time of arrival

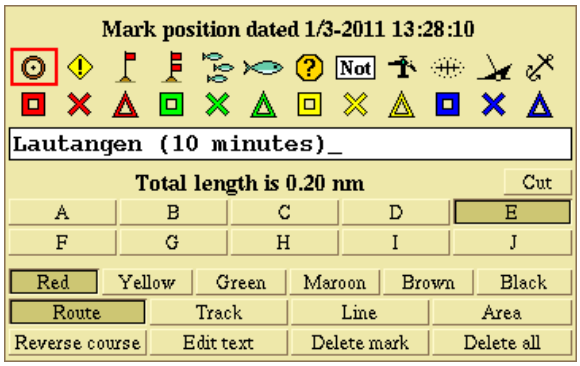
If a mark is named, or a route has named waypoints, a panel with a list of estimated times of arrivals opens.



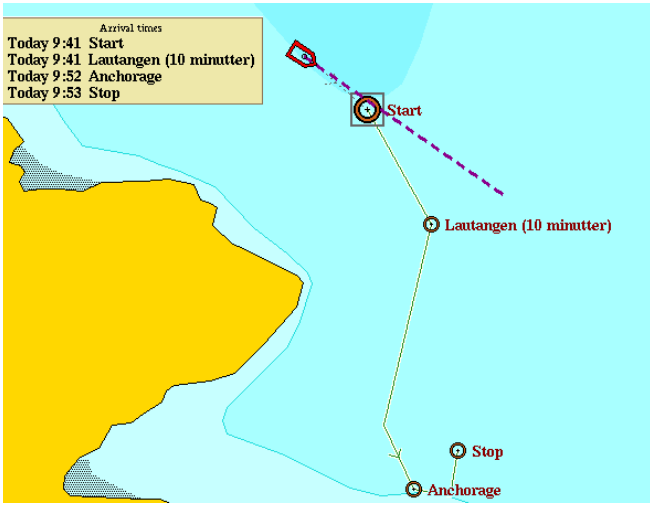
Theese times are calculated continuously, so any change in speed will change the times accordingly.

Length of stay can also be taken into account, enter the estimated length of stay after the port name in parentheses:

Name of port (10 minutes)



The time of arrival will be changed



Correction of autopilot lag

To keep the best possible course when the ship navigates along a line object with several waypoints, it is important to add the correction of autopilot lag.

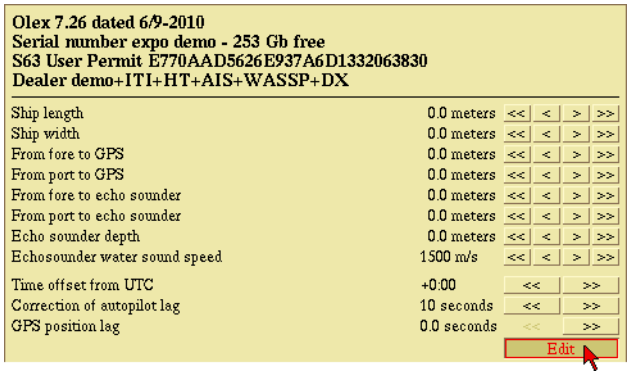
Olex navigates towards the last waypoint of each line. When the pointis passed, starts navigation towards the next waypoint.

By adding the correction of autopilot lag, Olex will calculate the ship's probable position in x seconds.
If it is estimated that the waypoint is passed, Olex starts navigation towards the next way point immediately, so that the course line is as straight as possible.

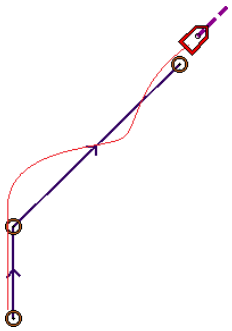
Without correction, the autopilot will calculate the new course first after the waypoint is passed.

It takes some time to maneuver the ship, and the number of seconds of correction varies from ship to ship and must be tested.

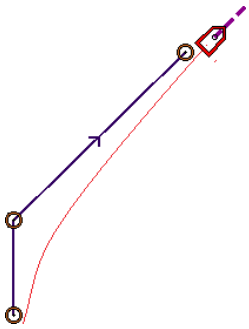
Click on the Settings to add the correction for autopilot lag.



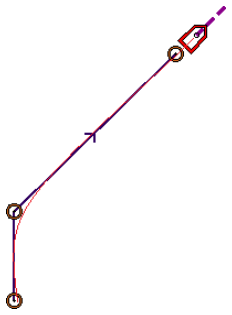
Under correction - for short term correction on autopilot. The ship turns too late and the price becomes unstable.



Over correction - for long-term correction on autopilot - the ship turns before it should.



The correct path - make time added on correction for delayed autopilot.



ARPA

SOFTWARE: Olex normal installation
HARDWARE: ARPA
INTERFACE: serial port

Olex systems with ARPA can detect and view other ARPA targets.
The targets are displayed as triangle symbols, and each target is assigned to a unique ID by the radar.

Gray icon means that the ARPA target has an uncertain position.

Red symbol means that the ARPA target has a confirmed position.

When one of the targets is touched by the mouse cursor a panel with information about the target's speed and course, and the distance to own ships, opens.

Click once inside the window to keep it open.

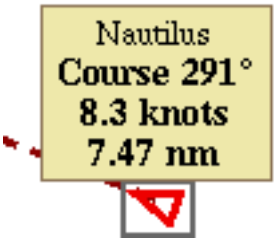
When the cursor is moved into the panel, the buttons Name and Track are added.

The panel is closed by clicking once inside the window.

Name the ARPA targets

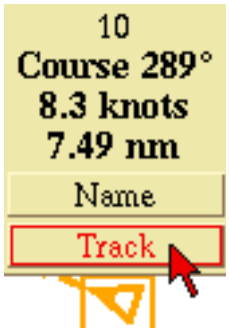
Click on Name and type the name in the text box that appears.

Click Ok to confirm.



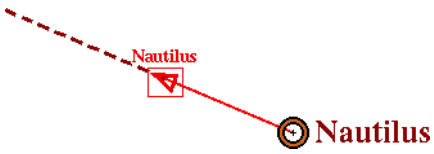
The name replaces the previous ID.

Tracks from ARPA targets

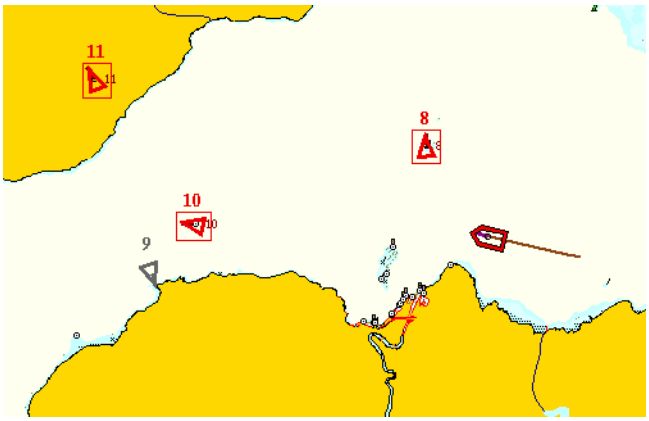


Clicking Track starts logging the ARPA targets track. The start tag gets the same name as the ARPA target.

A red frame around the symbol indicates that the track is being logged.



Open Layers → Default settings for new data, and select Automatic storing of radar tracks to log tracks for all ARPA targets automatically.

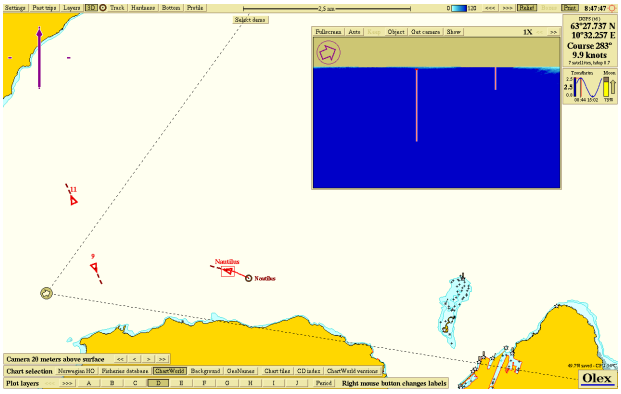


Note that to stop the logging of ARPA tracks, the logging of each target must be turned off manually.

Activate Info → Present trip to display the tracks for all ARPA targets. If an ARPA target disappears, the track will also disappear.

3D view

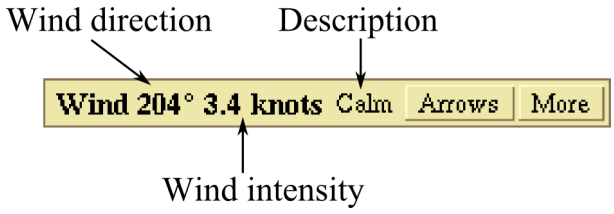
Click on 3D in the top menu to open a 3D image showing all ARPA targets within range. The features of the 3D viewer used in the same way as usual.



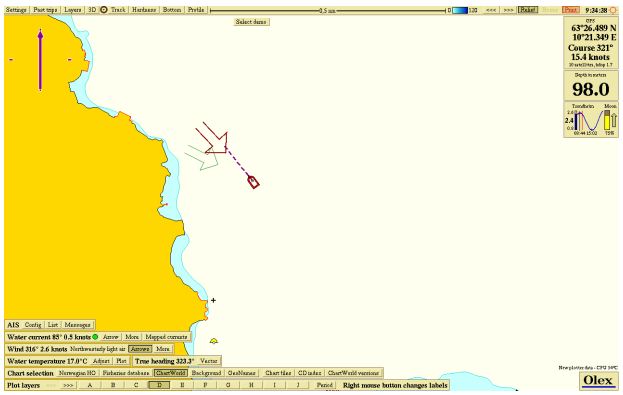
WIND

SOFTWARE: Olex normal installation
HARDWARE: wind speed sensor
INTERFACE: Serial port

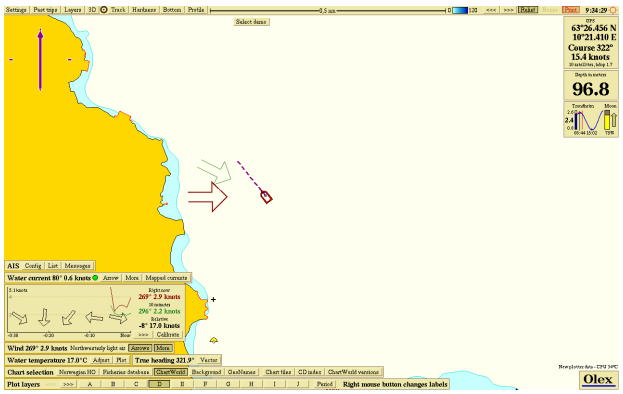
Vessels with a wind speed sensor have a panel in the lower left of the screen that shows wind- speed and direction, in addition to the meteorological name.



By clicking on Arrows, two arrows near the ship opens, that shows the wind direction.
The red arrow shows the wind direction at the moment, the green arrow shows the average wind direction for the last 10 minutes.

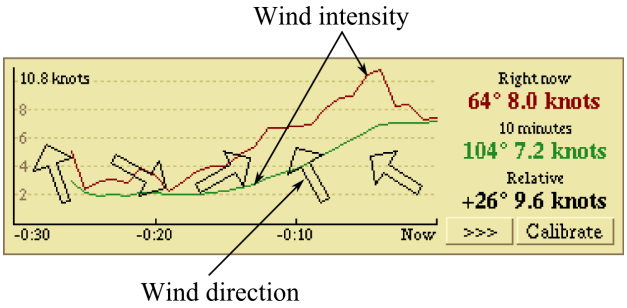


Click More to open a graphical overview of the wind direction and strength at a given period of time.

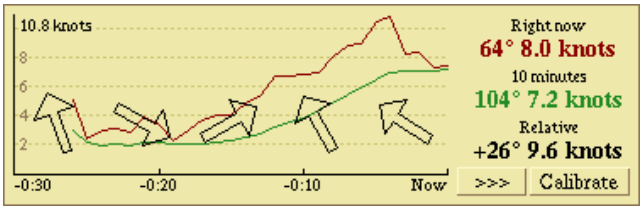


The panel displays the wind speed and direction at the moment, average wind speed for the last 10 minutes, and relative wind speed and direction.

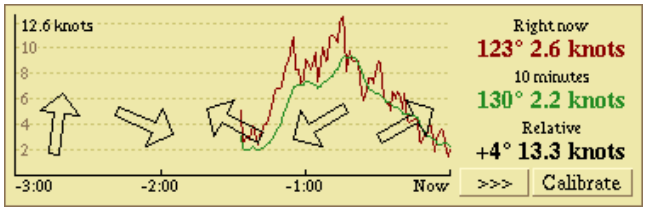
The graphs shows the wind speed over some time, and the arrows in the lower panel shows the variation in wind direction.



The graphs displays the wind data for a period of up to 24 hours.



The timeline view can be changed by clicking the arrow at the lower right.



Calibrating the wind speed sensor

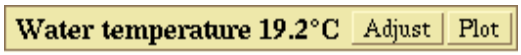
To get an accurate measurement of wind direction and speed, the wind speed sensor must be placed in parallel with the ships center line.

Measure the eviation relative to the centerline, click Calibrate og enter the value.

Water temperature

SOFTWARE: Olex normal installation
HARDWARE: temperature sensor
INTERFACE: serial port

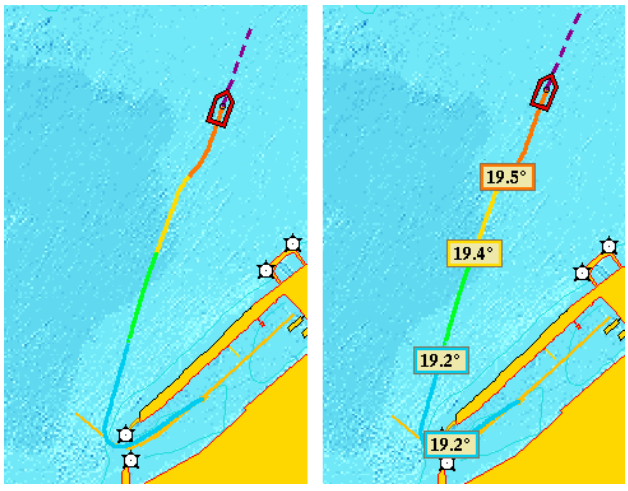
Water temperature may come from a separate temperature sensor, or from the echo sounder.
The temperature in the upper water layer is measured and displayed on a panel in the lower left corner of the screen.



By clicking Plot, the temperature panel expands.
A color palette opens, consisting of 10 colors by the interval between the minimum and maximum temperature.
The lowest range of the temperature scale is shown in blue tones, and the highest in red.
Minimum and maximum temperatures are displayed respectively on left and right side of the color palette.

The temperatur track appears in the ship's wake.

Clicking on Values displays the temperature values along the track.



Oceanic currents

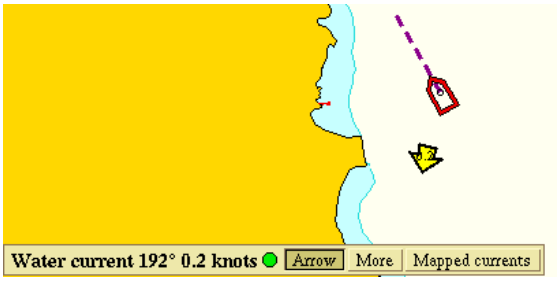
SOFTWARE: SB-key
HARDWARE: water speed sensor
INTERFACE: serial port

On the basis of measured positions, heading data, and water speed the Olex system can calculate the osceanic currents.

Surface current

The current is calculated continuously on the basis of recent measurements from GPS, heading sensor and the water speed sensor.
The panel on the left displays the current - i.e. which way the ship is going to drift if the engine power is stopped.

By clicking on Arrow, the current is visualized as an arrow pointing away from the vessel.



Current map

The moon's position relative to earth is considered to be the main source of *tidal currents*.
The Olex system calculates ocean currents in relation to the “lunar half day”, having a duration equivalent to the tidal rhythm.
The lunar half day is divided into 12 lunar hours, and by observing the current in the individual lunar hours, Olex can calculate future ocean currents.

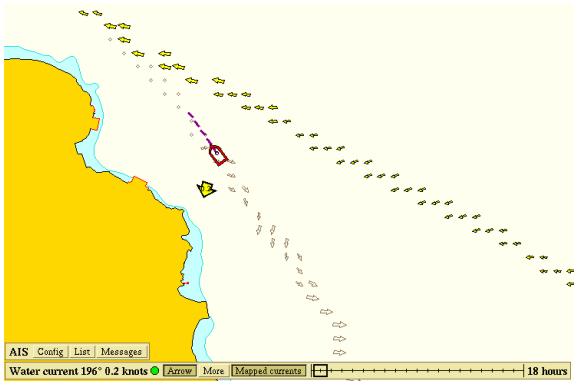
The ocean is divided into a grid, similar to the depth boxes, but with a slightly coarser resolution.

Each square - *current box*, contains a set of observations related to the timing of the lunar half day.

In addition to the measured currents at the moment, the measurements are stored in the current boxes and builds up a detailed map.

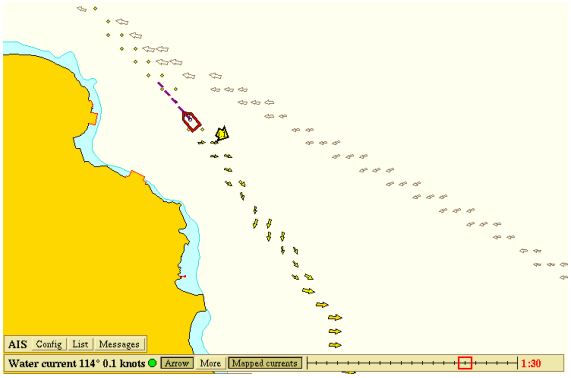
Each set of measurements is represented by an arrow that shows the current speed and direction.

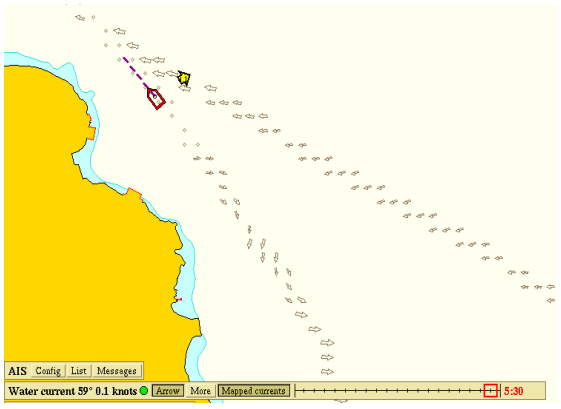
Click Mapped currents to view the map.



The timescale makes it possible to display a projection of currents in the next 18 hours.

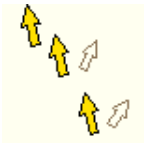
Drag the slider on the time scale to the right to show the estimated currents in the near future.



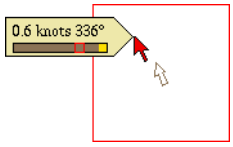


The yellow arrows in the current map shows how the computer has calculeted the currents at a particular time.

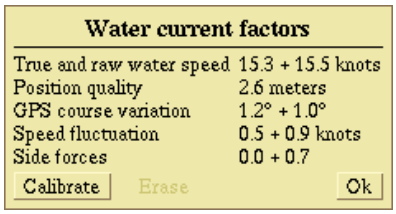
The white arrows applies to other periods.



When the cursor is moved over one of the arrows, a flag opens indicating whether there are former measurements or not.



The brown field represents the lunar half day, where previous measurements are highlighted in yellow. The red marker shows the current lunar time.
Clicking on More will open a list of parameters - an overview of the forces acting on the vessel at the moment.



Red values means that the parameters are outside the acceptable range, this can occur when the vessel is turning, the speed changes, or at high tides.

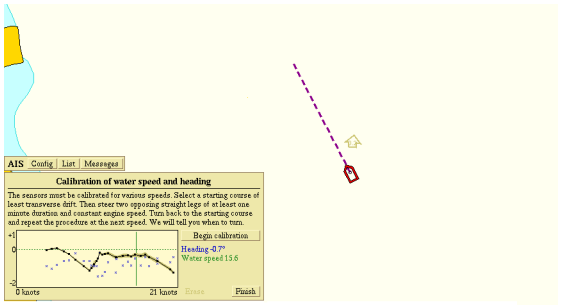
The calulation will stop, and no values are stored.

Calibrating the water speed sensor

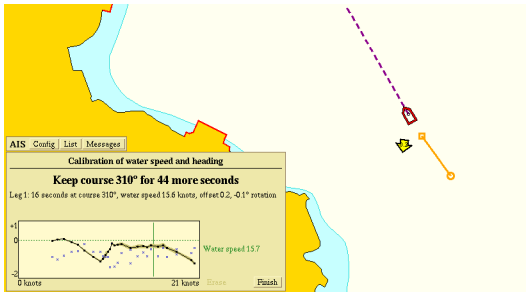
The water speed sensor must be calibrated to get the best results of the measurements.

Select a starting course with minimal drift and click More → Calibrate.
The Olex has a special mode where it asks the skipper to steer opposing straight lines at various speeds, automatically working out a graph of apparent water speed and correction factors.

1. Select a starting cource with minimal lateral drift, then Start calibration.



2. Follow the course that the system proposes at minimum of 1 minute. Use of autopilot is recommended.



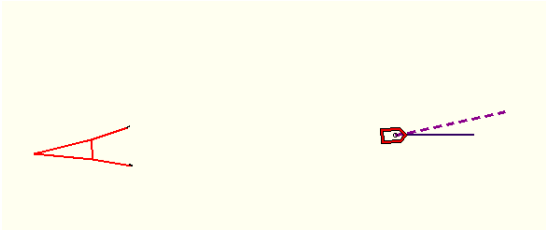
3. Follow the further instructions given by the system.

4. When the calibration is completed click Done.

ITI - Integrated Trawl Instrumentation

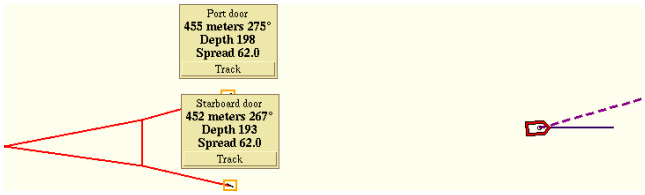
SOFTWARE: ITI-key
HARDWARE: ITI-trawl sensors
INTERFACE: serial port

Olex can be equipped with the trawl positioning systems Simrad ITI or Geonet IxSea. Sensors attached to the trawldoors visualizes the trawl in 2D and 3D with distance from the ship, direction, track and distance between the trawl doors.
The sensors provides signals to Olex, showing the trawls location as a symbol towed behind the ship.

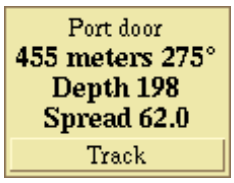


It is important to ensure that the sensors are placed correctly on the trawl.
If the sensors on the starboard and port trawl door are interchanged, wrong values are used for calculating the trawls position.

The sensors are shown as square boxes on the trawl symbol. Clicking on the boxes, opens a panel with information about the trawls condition. Each sensor has a panel that can be opened independently of the others.

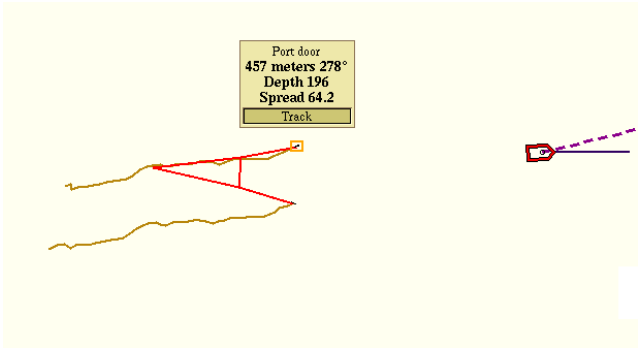


The panel shows the status of the port door with distance and direction from the ship, and the trawl depth and distance to the starboard door.



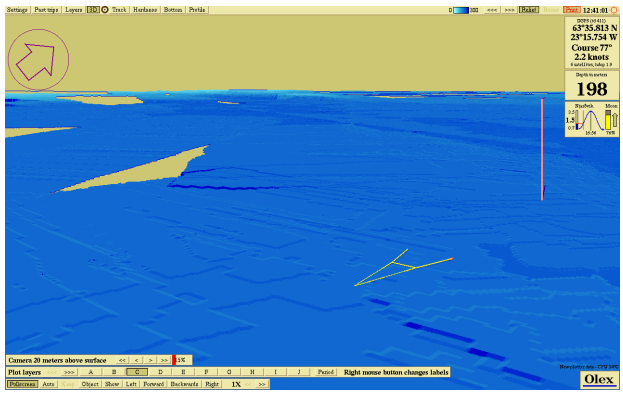
Track

Click on Track to start logging of the track for the trawl sensor.
The sensors are exposed to some noise, and Olex perform a filtering of the recieved signals.
Because of this, the track may have some inaccuracy in relation to the real movement.



3D view

Click on 3D in the main menu to open a 3D image showing the trawl.



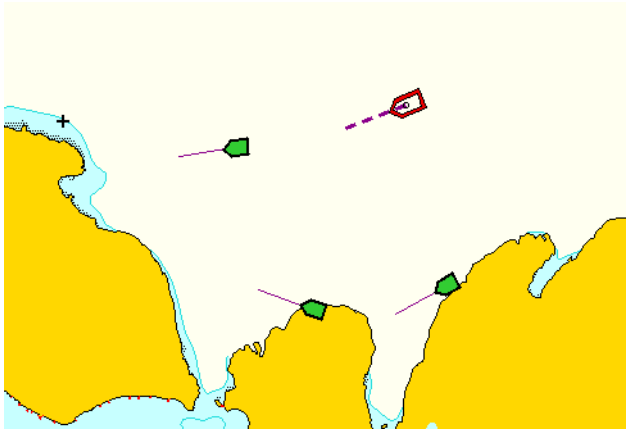
Sonar (Sound Navigation and Ranging)

SOFTWARE: ITI-key
HARDWARE: sonar
INTERFACE: serial port

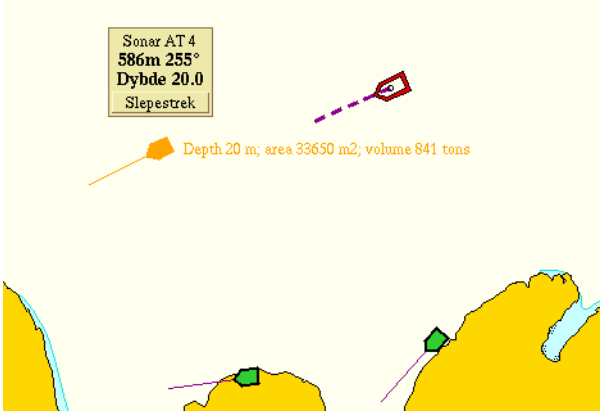
Sonars detects an echo of their own transmitted sound signals.
Adirectional ultrasonic pulse is emitted from a transducer, and when the pulse hits an object, the sound is reflected and captured by the transducer.

Fromthis echo the depth, speed, direction of the sonar targets extent is calculated.

Olex visualizes sonar targets as small green boxes with direction, the symbols is drawn in the center of the sonar objects.



When the mouse cursor touches one of the sonar targets, text line that shows the estimated depth, area and volume of object opens.
In addition, a panel opens that shows the target's assigned ID, direction and distance from own ship.
Click once inside the panel to keep it open.



Clicking on Track to start recording the sonar targets track.

The start mark is automatically labeled wiith estimated depth, area and volume of the sonar target.

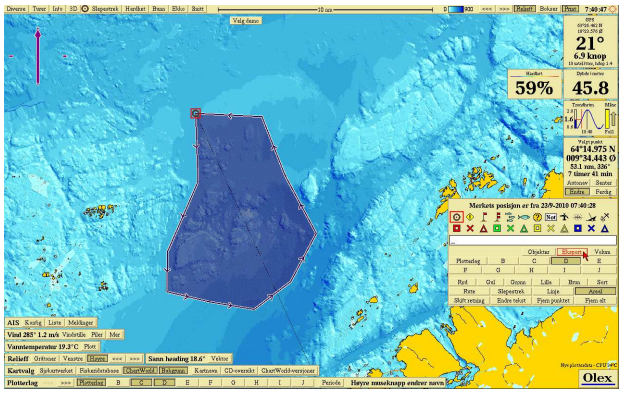
XYZ export

Exporting seafloor data

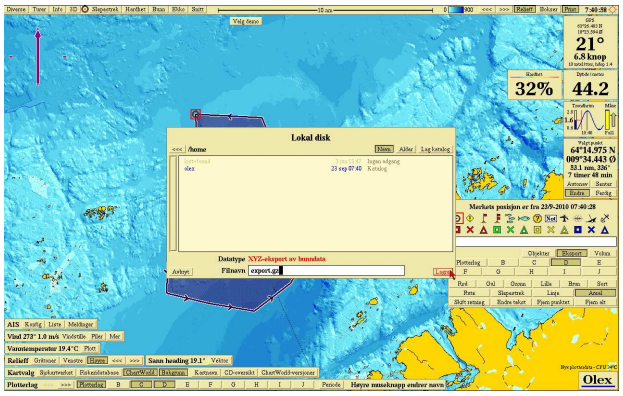
Seafloor data can be exported to other Olex machines, or to some other systems. The sea floor data is stored to a text file as ASCII format, and the file content are depth values with their corresponding GPS position.

Plotter data, like marks and tracks, are not included in the XYZ export.

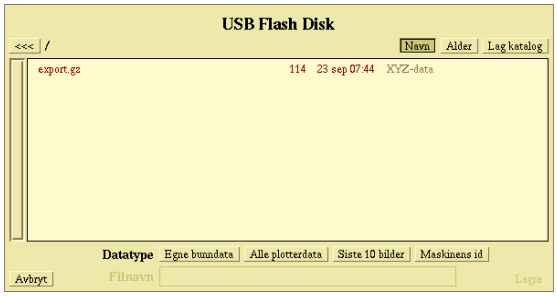
1. Create an area that limits the area to be exported.



2. Click Export in the **Edit-panel** and select the device where to save the file. All seafloor data in the area are compressed and placed in a file that is named "export.gz".

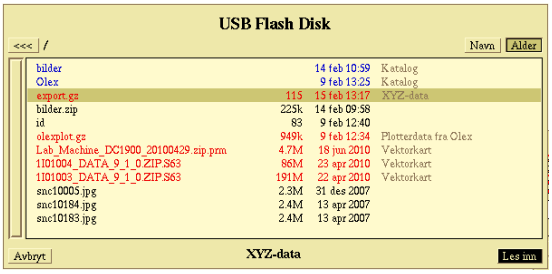


3. Save the file by clicking Save.



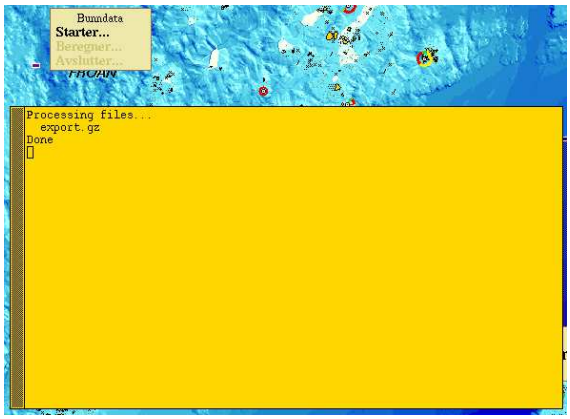
Importing seafloor data

1. Connect the device that contains the seafloor data to the machine, and click Read from to open the **Filebrowser.**



2. Choose the file that contains the seafloor data, and then click Read.
   Answer Yes when asked "XYZ data - do you really want to read?".

3. The data are imported and the bottom map is being recalculated. An yellow window showing the status of the import opens.



4. After the recalculation is finished, the window closes and the bottom map is displayed on the screen.

Appendix

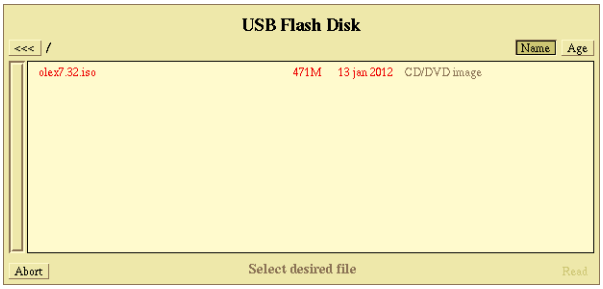
Upgrading the Olex version

From a USB device

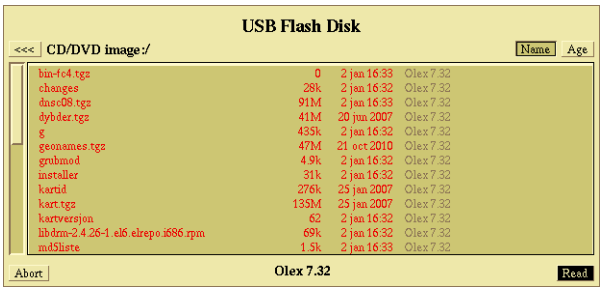
Find and download the latest Olex version on the website www.olex.no.

Save the *.iso- file* on a memory device. Connect it to your computer, and click Read from.

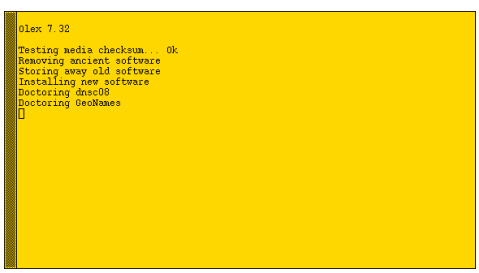
The filebrowser opens, click on the .iso-file



and then click inside the filebrowser window to select all the files.



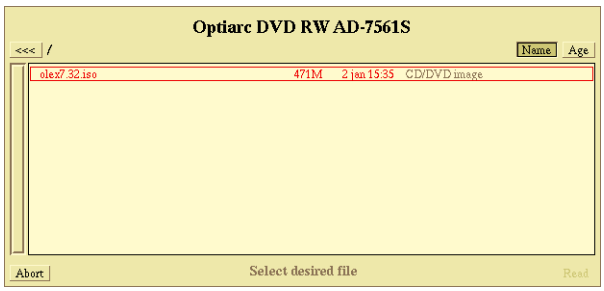
Click Read, and confirm when asked “Olex 7.32 - do you really want to read?”. A window showing the innstallation progress opens, any possible error messages will be displayed in the window.



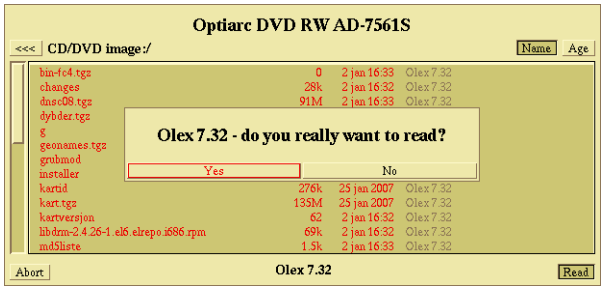
The computer restarts when the installation is complete.

From CD

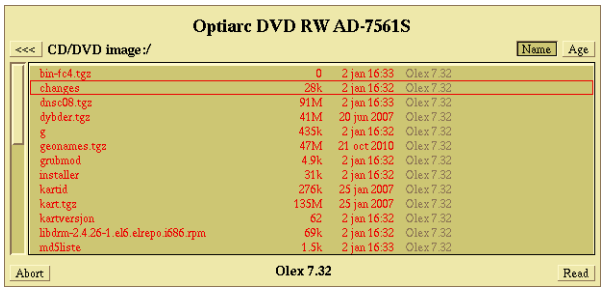
Insert the CD with Olex software, and click Settings→ Read data and software.



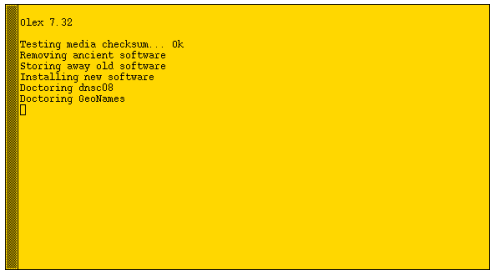
The filebrowser opens. Click on the . iso-file,



and click inside the filebrowser to select all the files.



Click Read, and confirm when asked “Olex 7.32 - do you really want to read?”.



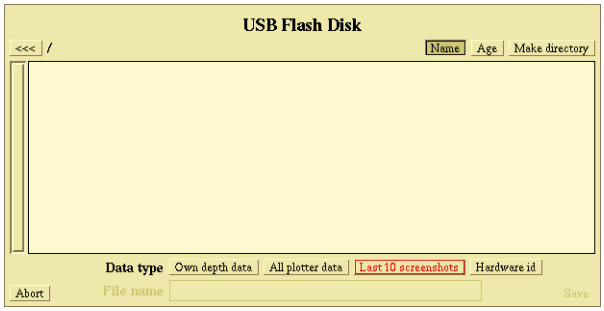
The computer restarts when the installation is complete.

Save screenshots

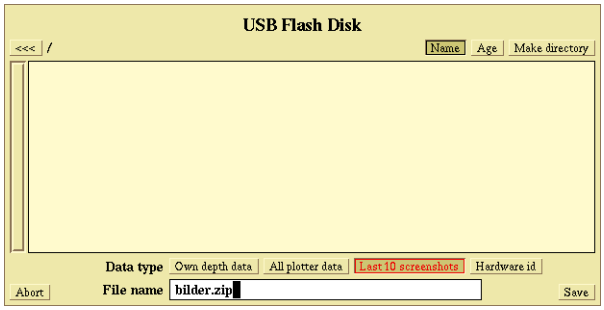
Click Print to save a picture of the screen, up to 10 screenshots can be stored.

The pictures are packed and stored as a .zip. file, which can be transferred to a memory device and extracted afterwards. Save the screenshots, connect a memory stick and click Write to.

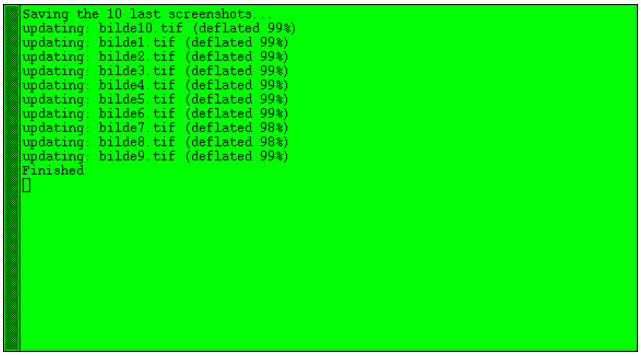
The file browser window opens, click the Last 10 screenshots button to save the screenshoots.



The file is automatically named "bilder.zip" but the filename can be changed.



The green window displays the status of the storage of images.



The window closes again when the file is stored.

Maintenance Mode

Maintenance Mode stops Olex and opens an interface in which it is possible to make changes to the software installation.

Maintenance mode can be opened in two different ways:

- Ctrl + Shift + right mouse button
- Select Maintenance Mode during startup.

Exit maintenance mode and (re)start Olex by typing "reboot".

Maintenance Mode/ Terminal Window

It is possible to open a terminal window, while Olex is running in the background, to see error messages, check disk space, etc.

Click **Ctrl + Alt + F2** to open.

Ctrl + Alt + F7 closes the terminal window again.

Updating the clock in Olex

The clock in the Olex will be updated automatically when the system receives NMEA messages from GPS or other instruments.

Hardware ID

An unique ID used to identify the system.

Hotkeys

Keyboard Shortcuts

F1 - Jump

F2/Home - Center

F3 - Edge

F4 - Enable or 3D view

F5 - Event mark

F6 - Start logging of the track

F7 - Stop logging of the track

F8 - Turns on or off the bottom zoom function

F9 - Decreases the color separaion range <<<

F10 - Increases the color separaion range >>>

F11 - Turns on relief

F12 - Turns off relief

Page Up - Zoom In

Page Down - Zoom out

Arrow keys - move the map in any direction

Using the mouse

Zooming

Zoom in - right mouse button or move the scroll wheel forward.

Zoom Out - Left mouse button or move the scroll wheel backward.

Move the map in any direction - press and hold both right and left mouse button, or the scroll wheel.

Create a new mark

Create a new mark - **Alt + left mouse button**, hold down the **Alt key** to create a line object.

Select a mark

Select a mark and open the **Edit Panel** - double click the left mouse button.

Delete a mark

Deleting a single mark - triple click (3 quick clicks) with the left mouse button.

Shortcuts

Ctrl + **Shift** + right mouse button - opens the maintenance mode.

Open a new shell / commandprompt

Ctrl + Alt + F2

System messages

Ctrl + Alt + F1

Return to the Olexscreen

Ctrl + Alt + F7

Quick display of the contents of a file

1. Create a mark
2. Enter [filename] to view the contents of the file

NMEA - messages

NMEA-messages in to the Olex system		
MESSAGE	**MEANING**	**SENSOR**
ABK	Adressed and binary broadcast acknowledgement	AIS
CUR	Water current layer	Water speed sensor
DBS	Depth below surface	Echo sounder
DBT	Depth below transducer	Echo sounder
DPT	Heading, deviation and variation	
GGA	Global positioning system fix data	GPS
HDG	Heading, deviation and variation	Gyroc compass, GPS compass, satelite compass
HDM	Heading magnetic	Magnetic compass
HDT	Heading true	Gyroc compass, GPS compass, satelite compass
HPR		
MTW	Water temperature	Temperature sensor
MWD	Wind ditrection and speed	Wind sensor
MWV	Wind speed and angle	Wind sensor
OSD	Own ship data	AIS
RMC	Recommended minimum navigation information	GPS, autopilot
TTM	Tracked target messages	ARPA
TLL	Target latitude and longitude	
VBW	Dual ground/ water speed	ARPA
VDM	UAIS VHF Data link messages	AIS
VDO	UAIS Data link Own vessel report	AIS
VTG	Track made good and ground speed	GPS
ZDA	Time and date	GPS
	From Olex to AIS and autopilot	
APB	Autopilot B sentence	
RMB	Reccommended navigation data for GPS	
VTG	Track made good and ground speed	
XTE	Measured cross track arrow	

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